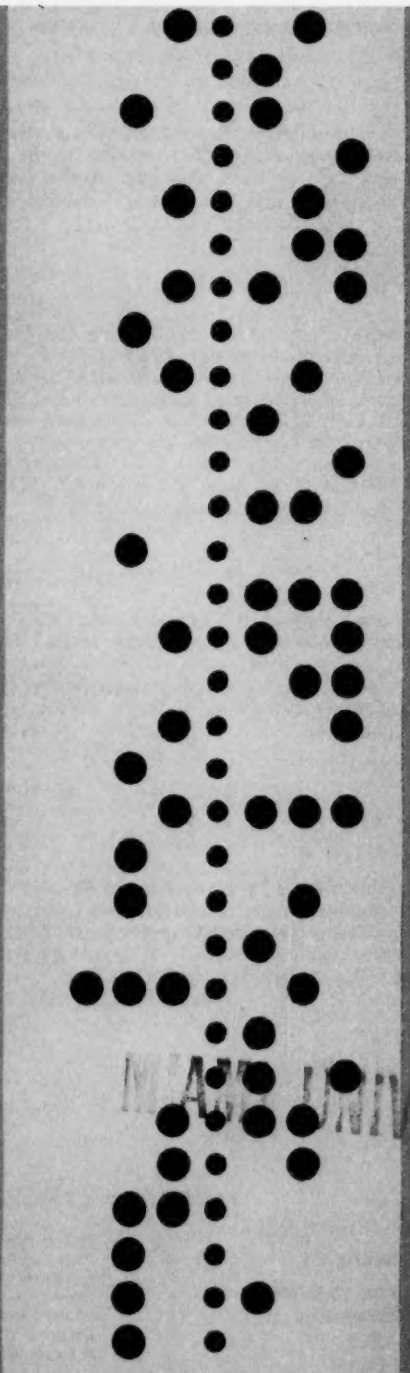
C 41.21: 41/5

March 10, 1966

U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS



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- *Abstracts of R & D Reports*
- *List of Current R & D Projects*
- *Indexes*

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March 10, 1966 / Volume 41, Number 5

U.S. Government

RESEARCH AND DEVELOPMENT REPORTS

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John T. Connor, Secretary

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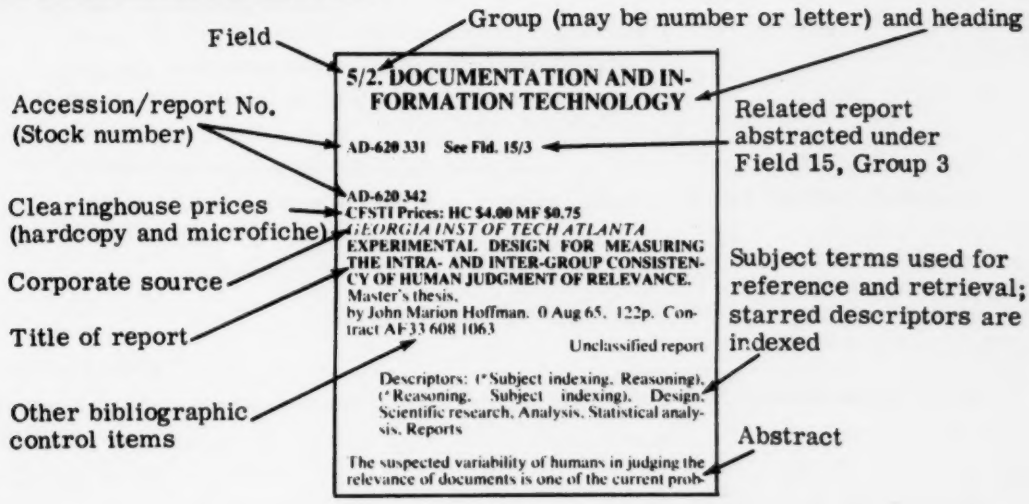
- TECHNICAL ABSTRACT BULLETIN
- OTHER RESEARCH REPORTS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Master's thesis,
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Unclassified report
Subject terms used for reference and retrieval; starred descriptors are indexed
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Abstract
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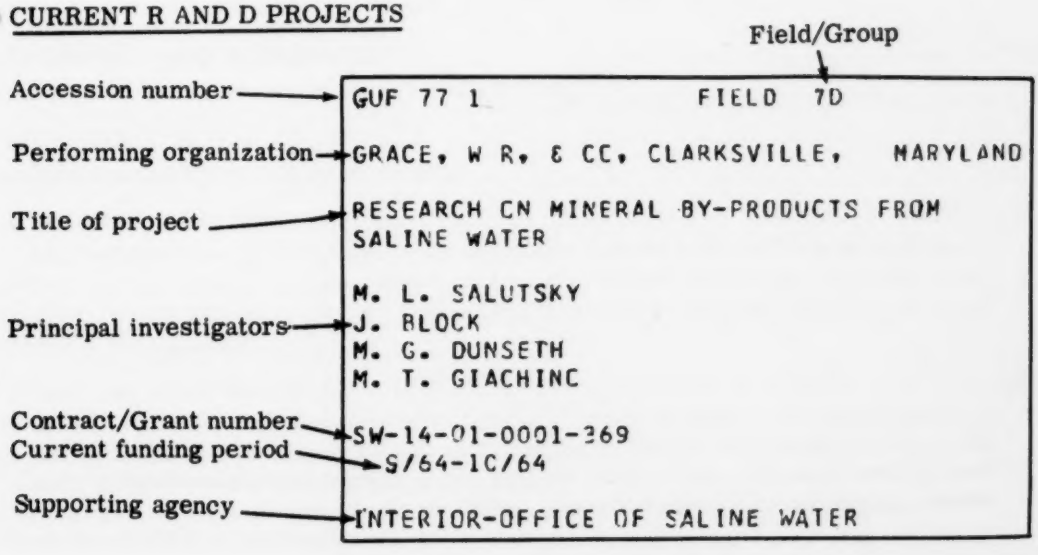
- CURRENT R AND D PROJECTS



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Section III TECHNICAL ABSTRACT BULLETIN (TAB) 1

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Citations of various articles in non-Government journals.

Selected Government Printing Office publications.

Indexes – Subject, Personal Author, Corporate Author-Monitoring Agency, Contract Number, Report Number, AD-Field.

Section IV OTHER RESEARCH REPORTS AND RELATED MATERIAL S-1

Atomic Energy Commission reports including engineering (CAPE) drawings.

National Aeronautics and Space Administration reports.

Other civilian agency reports.

Government-owned patents.

Military reports previously classified or limited.

Indexes – Subject, Personal Author, Corporate Source, Contract Number, Accession/Report Number.

SUBJECT CATEGORY HEADINGS

01 AERONAUTICS 1, S-1

Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities.

02 AGRICULTURE 2, S-2

Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry.

03 ASTRONOMY AND ASTROPHYSICS 2, S-2

Includes astronomy; astrophysics; and celestial mechanics.

04 ATMOSPHERIC SCIENCES 3, S-3

Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES 5, S-4

Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES 11, S-7

Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects.

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07 CHEMISTRY 20, S-12
Includes chemical engineering; inorganic chemistry; organic chemistry; physical chemistry; and radio and radiation chemistry.

08 EARTH SCIENCES AND OCEANOGRAPHY 28, S-15
Includes biological oceanography; cartography; dynamic oceanography; geochemistry; geodesy; geography; geology and mineralogy; hydrology and limnology; mining engineering; physical oceanography; seismology; snow, ice, and permafrost; soil mechanics; and terrestrial magnetism.

09 ELECTRONICS AND ELECTRICAL ENGINEERING 33, S-18
Includes components; computers; electronic and electrical engineering; information theory; subsystems; and telemetry.

10 ENERGY CONVERSION (Non-Propulsive) 40, S-21
Includes conversion techniques; power sources; and energy storage.

11 MATERIALS 40, S-22
Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.

12 MATHEMATICAL SCIENCES 45, S-27
Includes mathematics and statistics and operations research.

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING 48, S-28
Includes air conditioning, heating, lighting, and ventilating; civil engineering; construction epuipment, materials, and supplies; containers and packaging; couplings, fittings, fasteners, and joints; ground transportation equipment; hydraulic and pneumatic equipment; industrial processes; machinery and tools; marine engineering; pumps, filters, pipes, tubing, fittings, and valves; safety engineering; and structural engineering.

14 METHODS AND EQUIPMENT 53, S-33
Includes cost effectiveness; laboratories, test facilities, and test equipment; recording devices; reliability; and reprography.

15 MILITARY SCIENCES 56, S-35
Includes antisubmarine warfare; chemical, biological, and radiological warfare; defense; intelligence; logistics; nuclear warfare; and operations, strategy, and tactics.

16 MISSILE TECHNOLOGY 56, S-36
Includes missile launching and ground support; missile trajectories; missile warheads and fuzes; and missiles.

17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES 57, S-36
Includes acoustic detection; communications; direction finding; electromagnetic and acoustic countermeasures; infrared and ultraviolet detection; magnetic detection; navigation and guidance; optical detection; radar detection; and seismic detection.

18 NUCLEAR SCIENCE AND TECHNOLOGY 58, S-38
Includes fusion devices (thermonuclear); isotopes; nuclear explosions; nuclear instrumentation; nuclear powerplants; radiation shielding and protection; radioactive wastes and fission products; radioactivity; reactor engineering and operation; reactor materials; reactor physics; reactors (power); reactors (non-power); and SNAP technology.

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19 ORDNANCE 60, S–42
Includes ammunition, explosives; bombs; combat vehicles; explosions, ballistics, and armor; fire control and bombing systems; guns; rockets; and underwater ordnance.

20 PHYSICS 61, S–43
Includes acoustics; crystallography; electricity and magnetism; fluid mechanics; masers and lasers; optics; particle accelerators; particle physics; plasma physics; quantum theory; solid-mechanics; solid-state physics; thermodynamics and wave propagation.

21 PROPULSION AND FUELS 81, S–47
Includes air-breathing engines; combustion and ignition.

22 SPACE TECHNOLOGY 84, S–48
Includes astronautics; spacecraft; spacecraft trajectories and reentry; and spacecraft launch vehicles and ground support.

RESEARCH highlights

Reports of current high industrial interest

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Food Processing	ix
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Metals, Non-Ferrous and Alloys	x
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Semiconductors and Related Materials

CONSTANTS OF PIEZOELECTRIC AND ELECTROOPTIC SUBSTANCES LISTED

(Order Stock No. AD-624 095 Chemical Formulae of Measured Materials Showing the Piezoelectric, Electrooptic, and Piezooptic Effects, HC $1.00/MF $0.50.)

Chemical formulae of measured materials showing piezoelectric effects have been compiled by the Fort Monmouth Army Electronics Command. According to a Federal evaluator, no other similar complete tabulation exists. The Fort Monmouth work in a compilation of the literature lists the known and measured constants of piezoelectric and electrooptic substances, including crystals. It constitutes a pre-report of substances mentioned in the forthcoming New Series Landolt-Bornstein Numerical Data and Functional Relationships in Science and Technology. The seven crystal systems and 32 crystal classes covered are divided into organic and inorganic types. Under the heading, Symmetry Symbols, are the two most used notations -- those derived by Schonflies, and those of Hermann-Mauguin, used internationally. The section, Number of Constants, gives elastic, piezoelectric, dielectric, piezooptic, and electrooptic constants. Fort Monmouth comments that piezoelectric materials are becoming more and more important in frequency control, and that those showing the electrooptic effect are important for laser applications.

Biological and Medical Sciences

PNEUMATIC DRIVER DEVELOPED FOR ARTIFICIAL HEART EXPERIMENTS

(Order Stock No. PB-168 862 A Pneumatic Driver for Surgically Implanted Myocardial Augmentation Devices, HC $1.00/MF $0.50.)

A pneumatic driver for surgically implanted myocardial augmentation devices developed for the National Institutes of Health by North American Aviation consists of a solid-state relaxation oscillator with adjustable rate and pulse width to actuate a 4-way, 2-position solenoid valve. It is part of a cycling system capable of providing pneumatic energy requirements for various double-ventricle artificial hearts. The system can provide ample power for a man-sized artificial heart and has an adjustment range sufficient for use with dogs and various other experimental animals.

IMPROVED HEMODIALYSIS MEMBRANE DEVELOPED FOR KIDNEY MACHINES

(Order Stock No. PB-168 936 The Development of an Improved Hemodialysis Membrane, HC $2.00/MF $0.50.)

An improved hemodialysis membrane for use with artifical kidney machines is possible with nylon as a base, Battelle Memorial Institute concludes in a study carried out for the National Institutes of Health. Results obtained with nylon and nylon/epoxy membranes appear most promising in terms of dialysis properties, wet film strength, and potential for modification to less thromobogenic surface activity. Battelle prepared dialysis membranes both by crosslinking water-soluble polymers and by creating a microporous structure in water-insoluble plastics.

NEW SYSTEM COUNTS ALPHA AND BETA RADIATION SIMULTANEOUSLY

(Order Stock No. IDO-17122 A Practical Simultaneous Alpha Beta Counter for Applied Health Physics, HC $1.00/MF $0.50.)

A new simultaneous alpha beta counter developed by Philips' Atomic Energy Division can simultaneously count both types of radiation from a single source. The system uses a 2-1/4'' diameter proportional counter with a 2'' diameter, 1 mg/cm^2 aluminized mylar window as the detector. This counter, which is ideal for applied health physics work, drives an amplifier-discriminator which separates the alpha and beta pulses into two channels by the use of pulse height and anti-coincident circuitry. Previous system designs using window-type counters have resulted in units in which the alpha and beta sensitivities drift with time and temperature.

Safety Engineering

HANDBOOK GIVES SAFETY MEASURES FOR HANDLING SOLID PROPELLANTS

(Order Stock No. N65-20109 Solid Propellants Safety Handbook, HC $3.00/MF $0.75.)

A solid propellants safety handbook prepared for the John F. Kennedy Space Center gives rules for dealing with the hazards of propellant handling and storage. Types of propellants involved are the composite and the homogeneous single, double, or triple base. Such materials have a potential for fire and explosion, and are toxic. The handbook treats them under processing, transportation, storage, static electricity, fire prevention, ventilation, and personal hygiene. Barricading, separating propellant facilities from airfields, warning systems, and protective clothing are also discussed.

Communications

RADICALLY NEW WAVEGUIDE GLIDE SLOPE ANTENNA

(Order Stock No. PB-169 061 A Waveguide Glide Slope Antenna, HC $3.00/MF $0.75.)

A 60-foot waveguide glide slope antenna designed for the Federal Aviation Agency represents a radical departure from conventional glide slope design philosophy in airport instrument landing systems. Since the antenna does not rely upon ground reflections to form the path in space, ground illumination can be kept to a minimum, making irregular terrain less disturbing to the path. The degree of improvement depends upon the directivity of the waveguide array which in turn depends upon the array aperture. Since the waveguide array forms a path in space that can be made either flat or conical, it is possible to locate the array much farther from the runway than conventional ground-reflective systems which always produce a conical path. The primary objective of the new design is to improve path quality at difficult sites and to reduce the need for expensive ground leveling.

Electronics

BATTELLE PREPARES RELIABILITY PHYSICS NOTEBOOK

(Order Stock No. AD-624 769 Reliability Physics Handbook, HC $6.00/MF $1.50.)

A reliability physics notebook prepared by the Battelle Memorial Institute gives the electronics reliability engineer current state-of-the-art information relating to solid state electronic parts. The publication explains techniques and procedures for obtaining pertinent data on specific part types and methods of using this data in accelerated testing, screening, and reliability prediction programs. Because the field of reliability physics is relatively new, the notebook is intended as a preliminary effort and the format is designed to facilitate modifications and additions to existing information. Whenever it is possible, data are presented in useful tabular form. When topics are still largely conjectural, summaries of several investigators' results are given. The work is confined primarily to discrete devices, and emphasizes those part types with design or compositional characteristics related to microcircuit structures.

Food Processing

DETERMINING MEAT TEXTURE

(Order Stock No. AD-622 087 Fundamental Aspects of Meat Texture, HC $4.00/MF $1.00.)

Meat texture can be determined according to hardness, cohesiveness, elasticity, chewiness, and juiciness by a promising new tool developed by General Foods called a Texturometer. A total of 115 samples were evaluated and the instrument was found to be highly suitable for meat testing -- describing texture in an accurate and logical manner in agreement with GF's previous experience. Results correlate highly with sensory evaluation by a trained texture profile panel and with a number of other chemical, physical, and sensory tests. Fresh and freeze-dehydrated beef and pork were the meats studied.

Lubricants

ULTRA-STABLE SPIRAL-GROOVED TYPE GAS JOURNAL BEARING

(Order Stock No. AD-625 423 Experiments on an Ultra-Stable Gas Journal Bearing, HC $2.00/MF $0.50.)

An ultra-stable gas journal bearing of the spiral-grooved type has excellent steady-state and stability characteristics observed and verified by experiment, according to a Navy-sponsored study. This bearing has a greater load capacity than the plain journal at values of lambda greater than eight, less power loss, and stability equivalent to the tilting-pad bearing. A Federal evaluator defines lambda as a parameter called the bearing number. It depends on viscosity, speed of shaft rotation, ambient pressure, radius of shaft, and clearance between shaft and housing. In the study, an air impulse type turbine drove a 1.5-inch diameter shaft at 60,000 rpm. The shaft was mounted on two spiral-grooved, gas journal bearings with a radial clearance at zero speed of 495 micron-inch. The ambient gas was air, and the loadings were to a maximum of 12 pounds each at 40,000 rpm and 40 pounds at 60,000 rpm. The eccentricity ratios at these conditions were 0.28 and 0.63 respectively. Neither loaded nor unloaded bearings showed any signs of instability, and there was a good correlation between theoretical and experimental data.

Metals, Non-Ferrous and Alloys

REFRACTORY SHEET METAL TESTING METHODS EVALUATED

(Order Stock No. AD-625 606 Evaluation Test Methods for Refractory Metal Sheet Materials, HC $2.00/MF $0.50.)

An evaluation of test methods for refractory metal sheet materials made by the Materials Advisory Board of the National Academy of Sciences discusses tensile, compression, notched tensile, shear ultimate strength, and bend tests. Other tests reviewed include bearing strength, stress rupture and creep, weld evaluation, delamination, recrystallization temperature determination, fatigue, thermal conductivity, thermal expansion, specific heat, and modulus of elasticity. The Board's objective in making this review is to provide a standard basis for test evaluation of sheet materials produced under various Department of Defense development programs. The Board notes that as DoD programs have progressed, more specialized tests than tensile, creep-rupture, and thermal properties tests have become necessary to evaluate fabrication characteristics and to provide preliminary design data.

POWDER METALLURGY REVIEW COVERS TUNGSTEN

(Order Stock No. N66-10415 Tungsten Powder Metallurgy, HC $0.35/MF $0.50.)

Battelle Memorial Institute has prepared a review of tungsten powder metallurgy that discusses reduction to metal, powder size and purity, and ultrafine, spherical, and electrolytic powders. Because of the high melting point of tungsten, its production is dominated by powder metallurgy processes rather than by fusion associated techniques. A section of the review devoted to consolidation discusses cold mechanical and isostatic compaction, hot pressing, sintering, explosive compaction, powder rolling, extrusion of powder, vapor and plasma-arc deposition, pressureless consolidation, and infiltration. The review closes with a section on structures that includes discussions of infiltrated nozzle materials, high-strength composites, and tungsten ionizers.

Nuclear Technology

THE OAK RIDGE ELECTROMAGNETIC SEPARATIONS PROGRAM

(Order Stock No. ORNL-3861 Review of ORNL Electromagnetic Separations Program, HC $3.00/MF $0.50.)

The results of 20 years of experience and continued applied research are presented in a review of the Oak Ridge electromagnetic separations program. A major goal of the program is to provide in each separation enriched isotopes having higher purity and to develop equipment for separating beta-gamma emitting isotopes. Investigations are diversified and cover areas where useful information for developing either new or improved techniques and equipment might be acquired. Areas covered in the review include ion sources and receiver development, 180° sector studies, vacuum and contamination studies, isotope recovery, ion implantation, and new equipment for radioisotope applications. As better methods of process evaluation have been developed, both the ion output and the isotopic purity have been improved in a number of separations.

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SB–475 (Suppl. 1) Information and Storage
SB–488 (Suppl. 2) Masers and Lasers

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CURRENT research & development PROJECTS

01. Aeronautics

GH 851 1 FIELD 1C, 18,22A

NATL CTR ATMOSPH RES, BOULDER, COLORADO

DEVELOP BALLOON SYSTEMS AND CONDUCT HIGH-ALTITUDE BALLOON FLIGHTS

W. O. ROBERTS

NASA-NASR-185-SI-3
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02. Agriculture

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USDA, BELTSVILLE AND, HYATTESVILLE, MARYLAND

APPLICATION OF HYPERBOLIC PARABOLOID THEORY TO THE STRUCTURAL USE OF SHEET MATERIALS IN FARM BUILDING DESIGN

N. C. TETER, H. C. LIU
AG-AE-805-06R
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

ZYA 12173 1 FIELD 13H,20A

UNIVERSITY OF GEORGIA, AGRICULTURAL EXPT STA, GEORGIA

EFFECT OF WINDOW AND FLOOR COVERINGS ON NOISE ENVIRONMENT IN MODERN RURAL DWELLING

J. W. SIMONS

AG-AE-8-01-07
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

ZYA 12179 1 FIELD 13H,14B,20K

USDA, BELTSVILLE AND, HYATTESVILLE, MARYLAND

THE NATURE AND MAGNITUDE OF WIND FORCES ON FARM STRUCTURES

N. C. TETER, J. P. MASON

AG-AE-8-05-10
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ZYA 24075 3 FIELD 13B, 8F, 8H

USDA, ALBURQUERQUE, NEW MEXICO

WATERSHED REHABILITATION TO CONTROL EROSION AND SEDIMENTATION IN THE SOUTHWEST.

E. F. ALDON

AG-FS-01-06-019
/66- /

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ZYA 24078 3 FIELD 13G,13B, 8H

UNIV OF WISCONSIN, AGRICULTURAL EXPT STA, SUBSTNS + SEED FARMS, WISCONSIN

REDUCTION OF STORM RUNOFF AND SEDIMENTATION FROM NONGLACIATED FOREST LAND AREAS.

R. S. SARTZ

AG-FS-01-06-022
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ZYA 33071 3 FIELD 13G,13B, 8H

UNIVERSITY OF MISSOURI, AGRICULTURAL EXPT STA, AGRIC ENGINEERING, MISSOURI

IMPROVEMENT AND MODERNIZATION OF SURFACE AND SUBSURFACE DRAINAGE PRACTICES AND FACILITIES IN THE CORNBELT

J. F. THORNTON

AG-SWC-06-04
/66- /

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ZYA 33105 3 FIELD 13B, 8F, 8H, 8G

KANSAS ST UNIV AGR SCI, AGRICULTURAL EXPT STA, AGRONOMY, KANSAS

WIND EROSION CONTROL IN THE SOUTHERN PLAINS

W. S. CHEPIL

AG-SWC-08-09
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03. Astronomy and Astrophysics

GH 325 4 FIELD 3A, 3B, 9+

UNIVERSITY NEW MEXICO, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW MEXICO

INVESTIGATE RADAR ECHOES FROM THE MOON AND PLANETS, USING METHODS AND DATA FROM EARTH RADAR-RETURN STUDIES

A. H. ERTEZA
NASA-NSG-129-SI-3
10/64- 3/65

NASA

GH 413 2 FIELD 3A, 3B,20F

DOMINION OBSERVATORY, CANADA

OPTICAL SOLAR FLARE PATROL WITH HX MONOCHROMOATIC FILTER

V. GAIZAUSKAS
NASA-NSG-320-SI-3
6/65- 5/66

NASA

GH 1304 1 FIELD 1C, 18,22B,22A

UNIV OF WISCONSIN, GRADUATE SCHOOL, ASTRONOMY, WISCONSIN

INVESTIGATIONS AND STUDIES OF ULTRAVIOLET STELLAR SPECTRA AND ASSOCIATED INSTRUMENTATION

A. D. CODE, R. C. BLESS, L. R. DOHERTY T. E. HOUCK, J. F. MCNALL
NASA-NSG-618-SI-2
4/65- 3/66

NASA

GH 1393 FIELD 3A, 3B, 9+

PURDUE UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, INDIANA

STUDY OF DIRECT AND REFLECTED LUNAR RADIO WAVES

G. R. COOPER
NASA-NSG-543-E-2
12/63-11/64

NASA

GH 1449 FIELD 3A, 3B

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GH 1524 FIELD 3A, 3B, 5A

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, PHYSICS, ILLINOIS

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J. A. HYNEK

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US, SMITHSONIAN INST, DIST OF COLUMBIA

THE HISTORY OF PLANETARIA

S. A. BEDINI

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04. Atmospheric Sciences

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GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, GEORGIA

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THE SHAPE OF ATMOSPHERIC PARTICLES

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UNIV OF NEW HAMPSHIRE, GRADUATE SCHOOL, PHYSICS, NEW HAMPSHIRE

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UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, MICHIGAN

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D. G. RHOADES
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05. Behavioral and Social Sciences

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N C SCI + TECH RES CTR, NORTH CAROLINA
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THE POLITICAL PRINTS OF H. R. ROBINSON, NEW YORK PRINTMAKER

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06. Biological and Medical Sciences

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NORTHWESTERN UNIV, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, ILLINOIS

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1GM 9402 4 FIELD 7C, 7D,20J

UNIV OF MINNESOTA, SCHOOL OF PHARMACY, PHARMACEUTICAL CHEM, MINNESOTA

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PHS-NIH-DIV GENERAL MEDICAL SCIENCES

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AMERICAN UNIVERSITY, GRADUATE SCHOOL, DIST OF COLUMBIA

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ZXA 650023 FIELD 7C, 7D, 7B

U S PUBLIC HEALTH SERV, MARYLAND

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ZXA 650050 FIELD 7C, 7D,20J

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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

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USDA, DC, DIST OF COLUMBIA

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L. A. POWELL, R. A. KING, D. REIMUND
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07. Chemistry

1AI 5409 3 FIELD 7C, 7D,20J, 7B

SYRACUSE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

METAL COMPLEXES OF TETRACYCLINE AND DERIVATIVES

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PHS-NIH-NATL INST ALLERGY + INFECT DIS

1AI 5669 3 FIELD 7C, 7D, 7B

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UNIVERSITY OF TOLEDO, GRADUATE SCHOOL, CHEMISTRY, OHIO

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PHASE SEPARATION IN POLYELECTROLYTE SYSTEMS

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1/65-12/65

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1GM 8395 5 FIELD 7C, 7D, 7A,20J
MONTANA STATE COLLEGE, GRADUATE SCHOOL, CHEMISTRY, MONTANA

STRUCTURE OF ORGANIC PHOSPHATES

C. N. CAUGHLAN
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YALE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, CONNECTICUT

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W. LWOWSKI, S. M. HAI, L. H. SELMAN R. L. SMICK, F. P. WOERNER
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PHS-NIH-DIV GENERAL MEDICAL SCIENCES

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OREGON STATE UNIV, GRADUATE SCHOOL, SCIENCE RESEARCH INST, OREGON

SYNTHESIS OF GLYCOSYL PHOSPHATES

D. L. MACDONALD, L. GACHICH, R. Y. WONG
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STUDIES OF THE CATALYTIC ACTIVATION OF HYDROGEN

J. HALPERN
2/65- 1/66

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PURDUE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, INDIANA

STEREOSPECIFIC SYNTHESES VIA HYDROBORATION

H. C. BROWN, R. B. WETHERILL
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STANFORD RESEARCH INST, MENLO PARK, CALIFORNIA
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TEXAS COLL ARTS + INDS, GRADUATE SCHOOL, CHEMISTRY, TEXAS

PREPARATION OF SOME 7-RIBOSYLPURINES

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OHIO STATE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, OHIO

REDOX CHEMISTRY OF COBALAMINS

J. W. COLLAT, D. W. IMHOFF
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MASS INST OF TECHNOL, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

EXCITED-STATE CHEMISTRY

D. M. HERCULES
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MECHANISMS OF REACTIONS OF BUNTE SALTS

J. L. KICE
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UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

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HOOD COLLEGE, UNDERGRADUATE SCHOOL, PHYSICAL SCIENCES, MARYLAND

THE USE OF DINITROFLUOROANILINE IN PROTEIN CHEMISTRY

R. S. RATNEY
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R. H. HOLM
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IOWA ST UNIV SCI TECH, GRADUATE SCHOOL, CHEMISTRY, IOWA

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ELECTRONIC PROPERTIES OF COMPLEX MOLECULES

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METAL COMPLEXES OF THIOAMINO ACIDS

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S. D. DARLING
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MASS INST OF TECHNOL, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

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PRINCETON UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW JERSEY

METAL ION INTERACTIONS WITH WATER

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CLARKSON COL OF TECH, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

A MODEL STUDY ON THE ALKALOID SAMANDARINE

R. E. PARTCH
9/65- 8/66

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1MH 10107 2 FIELD 7C

SETON HALL UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW JERSEY

SYNTHESIS OF IBOGA ALKALOIDS AND RELATED COMPOUNDS

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PHS-NIH-NATL INST MENTAL HEALTH

1NB 4589 3 FIELD 7C

CLEMSON UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, SOUTH CAROLINA

SYNTHESIS OF IBOGA ALKALOIDS

J. W. HUFFMAN, T. KAMIYA
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CLARKSON COL OF TECH, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, NEW YORK

KINETICS OF ADSORPTION BY MOLECULAR SIEVES

H. L. SHULMAN, G. R. YOUNGQUIST
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MONTANA STATE COLLEGE, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, MONTANA

TERPENES FROM SULFATE PULP MILL WASTE LIQUOR

L. BERG
7-WP-00510-03
6/65- 5/66

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NATL CTR ATMOSPH RES, BOULDER, COLORADO

REACTIONS OF ATOMIC OXYGEN

R. D. CADLE, E. R. ALLEN, J. POWERS
7-AP-00343-02
6/65- 5/66

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7GX 1180 2 FIELD 7C, 7D, 7A

SOUTH DAKOTA SCH MINES, SCHOOL OF ENGINEERING, METALLURGY, SOUTH DAKOTA

ADSORPTION OF SURFACTANTS ON SELECTED MINERALS

R. W. SMITH, A. L. LINGARD

7-WP-611-02
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WOFFORD COLLEGE, UNDERGRAD SCH, CHEMISTRY, SOUTH CAROLINA

A COLORIMETRIC METHOD FOR ATMOSPHERIC SULFUR DIOXIDE

B. G. STEPHENS

7-ES-00112-01
6/65- 5/66

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7GX 1881 1 FIELD 7D, 7C, 7A, 7B

PENNSYLVANIA ST UNIV, SCHOOL OF MINERAL IND, FUEL TECHNOLOGY, PENNSYLVANIA

INTERACTION OF SULFUR DIOXIDE WITH CARBON SURFACES

P. L. WALKER, F. J. VASTOLA

7-AP-00406-01
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7GX 2637 1 FIELD 7A, 7D,20D

UNIV OF WISCONSIN, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, WISCONSIN

COALESCENCE OF DROPS IN A GASEOUS MEDIUM

E. J. CROSBY

7-AP-00421-01
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7GX 3320 1 FIELD 7C, 7A, 7D,20D

SYRACUSE UNIVERSITY, SCHOOL OF ENGINEERING, CHEMICAL + METAL ENGIN, NEW YORK

ATOMIZATION AND DROP SIZE OF NON-NEWTONIAN FLUID

C. TIEN
7-WP-00867-01
9/65- 8/66

PHS-BSS

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IIT RESEARCH INSTITUTE, AT ILL INST OF TECHNOL, ILLINOIS

STUDY TO DETERMINE TECHNICAL CHARACTERISTICS OF SYNTHETIC ION-EXCHANGE RESINS FOR MILITARY USE

J. I. BREGMAN, R. S. BRAMAN
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ARMY-MEDICAL SERVICE

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LITTLE ARTHUR D INC, MASSACHUSETTS

AQUEOUS ELECTROLYTIC SOLUTIONS

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ELECTROCHEMISTRY OF FUSED CARBONATES

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PRIMARY OXIDE ELECTRODES

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AN INVESTIGATION OF CHEMILUMINESCENT SYSTEMS AS RADICAL DETECTORS

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RADIATION CHEMISTRY OF ORGANIC COMPOUNDS

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THE EFFECTS OF RADIATION ON THE CHEMICAL ACTIVITY OF CERTAIN SOLID OXIDE CATALYSTS

L. H. STEELE, E. F. LEONARD

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MECHANISM OF SUBSTITUTION REACTIONS OF METAL COMPLEXES

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R. G. PEARSON
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CASE INST OF TECHNOL, GRADUATE SCHOOL, CHEMISTRY, OHIO

NUCLEATION AND COPRECIPITATION FROM HOMOGENEOUS SOLUTION

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A STUDY OF THE PARAMAGNETIC O2 MOLECULE ION IN THE ALKALI HALIDES

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OXIDATION OF AROMATIC AMINES BY PERACETIC ACID

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VETERANS ADMINISTRATION

ZO 22717 FIELD 7C, 7D, 7B

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HIGH TEMPERATURE REACTIONS

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RADIATIVE LIFETIMES OF EXCITED ELECTRONIC STATES

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THE CHEMISTRY OF SULFUR-NITROGEN COMPOUNDS

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THE CHEMISTRY OF HYDRIDES

W. L. JOLLY
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LIQUID AMMONIA CHEMISTRY

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KINETICS OF ELECTRON ATTACHMENT REACTIONS

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CHEMICAL KINETICS BY ELECTRON PARAMAGNETIC RESONANCE

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ELECTRON SPIN RESONANCE AND MICROWAVE SPECTROSCOPY

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THE MOLECULAR STATE OF PERCHLORIC ACID AND THE HYDRATION OF HYDROGEN ION

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STUDIES OF SOLID STATE AND SURFACE REACTIONS

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TRANSPORT OF CHARGE AND MASS IN ELECTROCHEMICAL SYSTEMS

C. W. TOBIAS
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PROPERTIES OF NONAQUEOUS IONIZING SOLVENTS

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DETERMINATION OF THE GROUND ELECTRONIC STATE OF LANTHANUM OXIDE GAS

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ZPF 661 FIELD 7D,20M,20J,20F

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THE OSCILLATOR STRENGTH OF THE C2 SWAN BANDS
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R. E. CONNICK, M. ADAMSON, D. FIAT
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MASS AND HEAT TRANSPORT IN REACTING SYSTEMS. COMPUTER IMPLEMENTED CONTROL OF CHEMICAL PROCESSES SYSTEMS.

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DIRECT OBSERVATION OF FREE RADICAL INTERMEDIATES IN COMPLEX REACTIONS

H. S. JOHNSTON
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THE STUDY OF COBALT AMMINECOMPLEXES IN SULFURIC ACID SOLUTIONS

W. L. JOLLY, A. HARRIS
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KINETICS OF ION RECOMBINATION

B. H. MAHAN
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KINETICS OF GAS REACTIONS

B. H. MAHAN, Y. LEE
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ZPF 674 FIELD 7D, 7A,20M,18A

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HIGH TEMPERATURE REACTOR CHEMISTRY

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ZUG 396 1 FIELD 7D,20M, 7B

USDI, BUR MINES, AMARILLO, TEXAS

GASEOUS THERMAL DIFFUSION
R. E. WOOD, R. W. TALIAFERRO
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INTERIOR-BUREAU OF MINES

ZUG 401 1 FIELD 7C, 7D, 7B

USDI, BUR MINES, AMARILLO, TEXAS

DIFFUSION OF BINARY GAS MIXTURES
R. A. GUERECA, J. L. GORDON
H. P. RICHARDSON

INT-BM-4332
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INTERIOR-BUREAU OF MINES

ZXA 650015 FIELD 7C, 7D

U S PUBLIC HEALTH SERV, MARYLAND

CONTROL OF SUGAR NUCLEOTIDE SYNTHESIS

E. F. NEUFELD, R. KORNFELD, S. KORNFELD
P. J. OBRIEN

NIH-NIAMD-LBM-7
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

ZXA 650027 FIELD 7C, 7D

U S PUBLIC HEALTH SERV, MARYLAND

BIS-4- CIS-2, 5-DIMETHYL-1-FORMYL PIPERAZINYLMETHANE

E. L. MAY
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

ZXA 650029 FIELD 7C, 7D

U S PUBLIC HEALTH SERV, MARYLAND

SYNTHESES AND REARRANGEMENTS WITH 1,2-DIHYDROPYRIDINE SYSTEMS

E. M. FRY
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

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ALDOLASE INHIBTORS

J. G. MURPHY
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

ZXA 650031 FIELD 7C, 7D

U S PUBLIC HEALTH SERV, MARYLAND

COMPLETION OF WORK ON THE PREPARATION OF 2-SUBSTITUTED BENZOMORPHANS

A. E. JACOBSON
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

ZXA 650033 FIELD 7C, 7D

U S PUBLIC HEALTH SERV, MARYLAND

POLYETHYLENEIMINE + INSTRUMENTATION

T. D. PERRINE, W. R. LANDIS
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

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U S PUBLIC HEALTH SERV, MARYLAND

REACTION OF MERCURIC ACETATE WITH INDOLE, TETRAHYDROCARBAZOLES, PROTEINS AND OTHER COMPOUNDS

L. K. RAMACHANDRAN, H. IWASAKI, B. WITKOP
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

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CHEMISTRY OF ISOCYANO-PEPTIDES

F. SAKIYAMA, B. WITKOP
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

ZXA 650055 FIELD 7D

U S PUBLIC HEALTH SERV, MARYLAND

SECTION ON MICROANALYTICAL SERVICES AND INSTRUMENTATION

W. C. ALFORD, B. BAER, H. K. MILLER
P. PARISIUS, A. WONG, A. WRIGHT
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

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PHOTOCHEMICAL REACTIONS OF STEROIDAL ALKALOIDS

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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

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U S PUBLIC HEALTH SERV, MARYLAND

CHEMICAL STRUCTURE OF TOMATILLIDINE

E. BIANCHI, H. BUDZIKIEWICZ, C. DJERASSI
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

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SYNTHESIS OF HETEROCYCLIC STEROIDS

Y. SATO, H. KANEKO
/65- /

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ANODIC DECARBOXYLATION OF CARBOXYLIC ACIDS

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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

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MOLECULAR STRUCTURE DETERMINED BY SPECTROSCOPIC METHODS
E. D. BECKER, R. B. BRADLEY, I. LEVIN
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

ZXA 650114 FIELD 7C, 7D,20J

U S PUBLIC HEALTH SERV, MARYLAND

MOLECULAR STRUCTURE, ORGANIZATION AND INTERMOLECULAR FORCES
E. CHARNEY
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

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U S PUBLIC HEALTH SERV, MARYLAND

STRUCTURE AND INTERACTION WITH ENVIRONMENT OF PARAMAGNETIC MOLECULES

H. KON
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OPTICAL ROTATORY DISPERSION

H. ZIFFER
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MATHEMATICS OF KINETICS AND REACTION-TRANSPORT SYSTEMS

J. Z. HEARON
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

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CHEMICAL KINETICS OF IODINATION

J. E. RALL, M. BERMAN, W. E. MAYBERRY
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

ZXA 650225 FIELD 7C, 7D

U S PUBLIC HEALTH SERV, MARYLAND

SYNTHESIS OF 5-BUTYL AMYL AND HEXYL-2-HYDROXY-2-METHYL-6,7-BENZOMORPHANS

E. L. MAY, C. F. CHIGNELL, B. C. JOSHI
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PHS-NIH-NATL INST ARTHRITIS + METAB DIS

ZXH 650101 FIELD 7D,12A

U S PUBLIC HEALTH SERV, MARYLAND

EVALUATION OF SOLUTE INTERACTION ON GAS CHROMATOGRAPHY RETENTION INDEX

K. ABEL, F. W. NOBLE, S. C. SMITH

NIH-INT-NHI-101
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PHS-NIH-NATL HEART INST

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U S PUBLIC HEALTH SERV, MARYLAND

FLUORESCENCE AND STRAY-LIGHT EFFECTS IN DIFFERENTIAL SPECTROSCOPY

E. NIHALYI

NIH-INT-NHI-150
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PHS-NIH-NATL HEART INST

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U S PUBLIC HEALTH SERV, MARYLAND

THE ENERGETICS OF SULFONIUM COMPOUNDS
S. H. MUDD
NIH-INT-M-CP-45
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PHS-NIH-NATL INST MENTAL HEALTH

ZYA 21045 3 FIELD 7C, 7D,20M,20J

USDA, PHILADELPHIA, PENNSYLVANIA

INTRA- AND INTERMOLECULAR STRUCTURE OF THE COMPONENTS AND DERIVATIVES OF ANIMAL FATS
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AGRICULTURE-DEPT OF AGRICULTURE

ZYA 21047 3 FIELD 7C, 7D,20J

USDA, PHILADELPHIA, PENNSYLVANIA

PREPARATION, POLYMERIZATION AND COPOLYMERIZATION OF POLYMERIZABLE AMIDES FROM ANIMAL FATS

A. N. WRIGLEY
AG-E06-03-066
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AGRICULTURE-DEPT OF AGRICULTURE

ZYA 21084 3 FIELD 7C, 7D, 7B

USDA, PHILADELPHIA-OBS, OLETE FY-1965
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PREPARATION OF CHEMICAL DERIVATIVES FROM INEDIBLE FATS FOR USE IN MODIFICATION OF POLYMERS

A. N. WRIGLEY
AG-E06-03-055R
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AGRICULTURE-DEPT OF AGRICULTURE

ZYA 21122 1 FIELD 7C, 7A, 7D

USDA, PHILADELPHIA, PENNSYLVANIA

SYNTHESIS OF CHEMICAL INTERMEDIATES BY THE INTRODUCTION OF REACTIVE ESTER, SULFUR AND OXYGEN FUNCTIONAL GROUPS INTO ANIMAL FATS.

L. S. SILBERT
AG-E-06-03-080
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AGRICULTURE-DEPT OF AGRICULTURE

ZYA 28138 1 FIELD 7C, 7D

USDA, PEORIA, ILLINOIS

PREPARATION OF NEW AND NOVEL PRODUCTS FROM UNMODIFIED AND THIN-BOILING CEREAL STARCHES

G. F. FANTA

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AGRICULTURE-DEPT OF AGRICULTURE

ZYA 28138 2 FIELD 7C, 7D

USDA, PEORIA, ILLINOIS

PREPARATION OF NEW AND NOVEL PRODUCTS FROM UNMODIFIED AND THIN-BOILING CEREAL STARCHES

G. F. FANTA
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ZYA 28141 1 FIELD 7C, 7D

USDA, PEORIA, ILLINOIS

CHEMICAL MODIFICATION OF CRAMBE OIL AND OF ACIDS READILY DERIVED FROM IT

T. K. MIWA

AG-N-05-05-050
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AGRICULTURE-DEPT OF AGRICULTURE

ZYA 28143 1 FIELD 7C, 7D,11G,20J

USDA, PEORIA, ILLINOIS

RELATION OF FILM PROPERTIES OF CORN AMYLOSE TO MOLECULAR STRUCTURE

H. F. ZOBEL
AG-N-01-01-257
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AGRICULTURE-DEPT OF AGRICULTURE

ZYA 32181 1 FIELD 7C, 7D,11G

USDA, NEW ORLEANS, LOUISIANA

PREPARATION OF CHEMICALLY MODIFIED FATTY ACIDS OR OILS FROM POTENTIALLY NEW OILSEED CROPS

G. F. DOLLEAR, G. SUNRELL
AG-S05-05-052
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AGRICULTURE-DEPT OF AGRICULTURE

ZYA 32184 1 FIELD 7C, 7D

USDA, OLUSTEE, FLORIDA

PREPARATION OF 6-HYDROXYMETHYLABIETIC ACID FROM PINE GUM

G. W. HEDRICK, B. A. PARKIN

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AGRICULTURE-DEPT OF AGRICULTURE

08. Earth Sciences and Oceanography

7GX 530 4 FIELD 8D, 8H, 7B

RUTGERS THE STATE UNIV, GRADUATE SCHOOL, ZOOLOGY, NEW JERSEY

IMPOUNDMENT STUDIES ON THE RARITAN RIVER, NEW JERSEY

F. B. TRAMA
7-WP-00059-04
6/65- 5/66

PHS-BSS

7GX 2922 1 FIELD 8H,12A, 8E

STATE UNIV N Y BUFFALO, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NEW YORK

DYNAMIC MODEL STUDY OF LAKE ERIE

R. R. RUMER, R. L. KETTER
7-WP-00037-01
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PHS-BSS

GH 49Z 1 FIELD 3A, 8D

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

INVESTIGATION OF ORIGIN, AGE AND COMPOSITION OF METEORITES

E. ANDERS

NASA-NSG-366-P-1
2/64- 1/65

NASA

GH 1543 FIELD 3A, 8D

MELLON INST OF INDUS, PENNSYLVANIA

A STUDY OF METALLIC AND STONEY METEORITES

L. VASSAMILLET
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NASA

GPE 449 2 FIELD 7D, 7C, 8D, 8H

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

THE FATE OF IRON AND ZINC IN NATURAL SURFACE WATERS

J. T. OCONNOR
AT-11-1-1264
2/65- 2/66

AEC-BIOLOGY + MEDICINE

GPE 1031 FIELD 8H

OHIO STATE UNIVERSITY, GRADUATE SCHOOL, POLAR STUDIES, OHIO

GLACIOLOGICAL INVESTIGATIONS ON THE CASEMENT GLACIER, ALASKA

D. N. PETERSON, C. B. BULL
R. P. GOLDTHWAIT, D. SAARELA

AT(11-1)1473
5/65- 4/66

AEC-BIOLOGY + MEDICINE

GSB 95 5 FIELD 8D, 8G

US, SMITHSONIAN INST, DIST OF COLUMBIA

ENVIRONMENT OF PERMO-TRIASSIC REPTILES OF THE ORDER THERAPSIDA IN SOUTH AFRICA

N. HOTTON

NSF-GB-1647
10/65-10/66

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

ZTA 15 FIELD 8D, 8F, 8G

US, SMITHSONIAN INST, DIST OF COLUMBIA

ENVIRONMENT OF PERMO-TRIASSIC REPTILES OF THE ORDER THERAPSIDA IN SOUTH AFRICA

N. HOTTON
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SMITHSONIAN INSTITUTION

ZTA 312 FIELD 8D

US, SMITHSONIAN INST, DIST OF COLUMBIA

FOSSIL BRYOZOA OF THE SIMPSON GROUP OF OKLAHOMA

R. S. BOARDMAN
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SMITHSONIAN INSTITUTION

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US, SMITHSONIAN INST, DIST OF COLUMBIA

REVISION OF THE PALEOZOIC TREPOSTOMATOUS BRYOZOA

R. S. BOARDMAN
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SMITHSONIAN INSTITUTION

ZUA 803 FIELD 8D, 8H

USDI, GEOL SURV, DIST OF COLUMBIA

HYDROLOGIC INFLUENCES OF STRIP MINING, BEAVER CREEK, KENTUCKY

G. W. WHETSTONE, J. J. MUSSER
/65- /

INTERIOR-GEOLOGICAL SURVEY

ZUA 806 FIELD 8H

USDI, GEOL SURVEY BILL, MONTANA

GEOLOGY AND GROUND-WATER RESOURCES OF THE KALISPELL VALLEY, FLATHEAD COUNTY, MONTANA

R. L. KONIZESKI, A. BRIETKRICTZ
7/64- 6/65

INTERIOR-GEOLOGICAL SURVEY

ZUA 807 FIELD 8H

USDI, GEOL SURVEY BILL, MONTANA

GROUND-WATER LEVELS OF MONTANA

NONE
7/65- 6/66

INTERIOR-GEOLOGICAL SURVEY

ZUA 808 FIELD 8H, 8G,12A

USDI, GEOL SURVEY BILL, MONTANA
GROUND-WATER RESOURCES OF THE POWDER RIVER BASIN, SOUTHEASTERN MONTANA
D. J. TAYLOR
7/65- 6/66

INTERIOR-GEOLOGICAL SURVEY

ZUA 809 FIELD 8D, 8H, 8G

USDI, GEOL SURVEY BILL, MONTANA

GEOLOGY AND GROUND-WATER RESOURCES OF THE CUT BANK AREA, TOOLE + GLACIER COUNTIES, MONTANA

E. A. ZIMMERMAN
7/64- 6/65

INTERIOR-GEOLOGICAL SURVEY

ZUG 16 1 FIELD 8D,12A, 5C

USDI, BUR MINES, SAN FRANCISCO, CALIFORNIA

COMPUTER ANALYSIS OF OIL AND GAS RECOVERY PERFORMANCES

R. V. HIGGINS, D. W. BOLEY
A. J. LEIGHTON

INT-BM-13-1598-A
/65- /

INTERIOR-BUREAU OF MINES

ZUG 36 1 FIELD 7D,21B,21D, 8D

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

RADIOACTIVE TRACERS IN EVALUATING FLUID DYNAMIC OF PETROLEUM PRODUCTION

F. E. ARMSTRONG, C. E. ARTHUR
G. E. FLETCHER, W. D. HOWELL
INT-BM-3739
/65- /

INTERIOR-BUREAU OF MINES

ZUG 78 1 FIELD 8D, 8G

USDI, BUR MINES, SPOKANE, WASHINGTON

ROCK BURST STUDIES

G. G. WADDELL
INT-BM-14-4140-7
/65- /

INTERIOR-BUREAU OF MINES

ZUG 79 1 FIELD 8D,11B,12A,13M

USDI, BUR MINES, SPOKANE, WASHINGTON

PRECAST CONCRETE MINE SUPPORTS

G. T. KREMPASKY, K. R. DORMAN
M. S. OUDENHOVEN, M. O. SERBOUSEK
INT-BM-14-4140-8
/65- /

INTERIOR-BUREAU OF MINES

ZUG 92 1 FIELD 8D,20L,20K

USDI, BUR MINES, SPOKANE, WASHINGTON
ROCKBOLT ANCHORAGE

E. W. PARSONS, D. R. EKLUND, L. OSEN

INT-BM-14-4140-12
/65- /

INTERIOR-BUREAU OF MINES

ZUG 100 1 FIELD 8G, 8D

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - ROCK MECHANICS RESEARCH IN PILLAR MINING
W. L. DARE, W. R. SHARP

INT-BM-4142-D
/65- /

INTERIOR-BUREAU OF MINES

ZUG 112 1 FIELD 8G, 8D, 5A

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

INVESTIGATION OF ANISOTROPISM ON MINE ROCK

J. R. MCWILLIAMS, P. PEMRICK, R. E. THILL
R. J. WILLARD

INT-BM-4143-2
/65- /

INTERIOR-BUREAU OF MINES

ZUG 114 1 FIELD 8K, 8G, 8D, 5A

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

BLASTING MODEL STUDIES

D. E. FOGELSON, D. V. DANDREA
R. L. FISCHER
INT-BM-4143-4
/65- /

INTERIOR-BUREAU OF MINES

ZUG 115 1 FIELD 8G, 8D

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

EFFECTS OF GEOLOGIC STRUCTURE ON BLASTING

D. E. FOGELSON
INT-BM-4143-6
/65- /

INTERIOR-BUREAU OF MINES

ZUG 116 1 FIELD 8K, 8G, 8D

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

SEISMIC EFFECTS OF UNDERGROUND BLASTING

D. E. FOGELSON, J. J. OLSON

INT-BM-4143-5
/65- /

INTERIOR-BUREAU OF MINES

ZUG 117 1 FIELD 8D, 8G, 5A

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

ROCK FRAGMENTATION BY THERMAL MEANS

R. L. MAROVELLI, T. CHEN, R. E. GRIFFIN
B. J. MITCHELL, K. F. VEITH

INT-BM-4143-7
/65- /

INTERIOR-BUREAU OF MINES

ZUG 118 1 FIELD 8G, 8D

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

ROCK FRAGMENTATION BY DIELECTRIC AND INDUCTION HEATING

R. L. MAROVELLI, R. E. GRIFFIN, W. KNOX
INT-BM-4143-8
/65- /

INTERIOR-BUREAU OF MINES

ZUG 119 1 FIELD 7D, 7C, 8D, 8G

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

EFFECT OF CHEMICAL ADDITIVES ON ROCK FRAGMENTATION

O. TERICHOW, W. H. ENGELMANN, T. E. FINCH

INT-BM-4143-9
/65- /

INTERIOR-BUREAU OF MINES

ZUG 121 1 FIELD 8G, 8D

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

FUNDAMENTAL DRILLING RESEARCH

J. PADNE, S. TANDANAND

INT-BM-4143-11
/65- /

INTERIOR-BUREAU OF MINES

ZUG 122 1 FIELD 8G, 8D

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

ROCK DRILLABILITY STUDIES

J. PADNE, W. E. BRUCE, D. L. MADSON

INT-BM-4143-12-13
/65- /

INTERIOR-BUREAU OF MINES

ZUG 126 1 FIELD 8D, 8K, 8G, 5A

USDI, BUR MINES, COLLEGE PK, MARYLAND

FUNDAMENTAL BLASTING STUDIES

W. I. DUVALL, J. M. DOOLEY
H. R. NICHOLLS, J. M. PUGLIESE
L. D. SADWIN

INT-BM-4144-1
/65- /

INTERIOR-BUREAU OF MINES

ZUG 130 1 FIELD 8G, 8D

USDI, BUR MINES, COLLEGE PK, MARYLAND

ROCK MECHANICS OF EVAPORITE DEPOSITS

L. A. PANEK, J. B. SELLERS, W. J. STURGIS

INT-BM-4144-5
/65- /

INTERIOR-BUREAU OF MINES

09. Electronics and Electrical Engineering

ZKD 346 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

TRANSISTORIZED AUDIO AMPLIFIERS - SIX CHANNEL AMPLIFIER
. NONE

FAA-RD-111-2-D-31
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 347 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

TRANSISTORIZED AUDIO AMPLIFIERS - FOUR-CHANNEL REGULATED AMPLIFIER

. NONE
FAA-RD-111-2-D-32
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 350 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF TYPE 300 AND 301 SWITCHING SYSTEMS - 300 SWITCHING SYSTEMS IMPROVEMENTS

. NONE
FAA-RD-111-11-D-31
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 351 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA
MODERNIZATION OF TYPE 300 AND 301 SWITCHING SYSTEMS - SWITCHING SYSTEM IMPROVEMENTS
FAA-RD-111-11-D-32
/65- /
. NONE
FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 371 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RAPPI/SCAN CONVERTER INTEGRATED DISPLAY - PROCUREMENT SPECIFICATION

. NONE
FAA-RD-112-27-D
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 372 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RAPPI/SCAN CONVERTER INTEGRATED DISPLAY - MODIFICATION AND INTEGRATION OF RAPPI/SCAN CONVERTER DISPLAY EQUIPMENT

. NONE
FAA-RD-112-27-X
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 373 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RAPPI/SCAN CONVERTER INTEGRATED DISPLAY - EVALUATION OF A RAPPI/SCAN CONVERTER INTEGRATED DISPLAY

. NONE
FAA-RD-112-27-V
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 399 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADIO FREQUENCY INTERFERENE - RADIO FREQUENCY INTERFERENCE SYSTEM DEVELOPMENT

W. B. GIBBONS
FAA-RD-541-001-00-V
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 400 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR AND BEACON VIDEO PROCESSING SYSTEMS - DEVELOPMENT OF RADAR VIDEO DATA PROCESSOR
FAA-RD-231-001-01-C
/65- /
. NONE
FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 401 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR AND BEACON VIDEO PROCESSING SYSTEMS - ENVIRONMENTAL ENGINEERING FOR RADAR VIDEO DATA PROCESSOR (RVDP)
. NONE

FAA-RD-231-001-01-E
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 403 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR AND BEACON VIDEO PROCESSING SYSTEMS
FAA-RD-231-001-01-X
/65- /
. NONE
FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 404 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR AND BEACON VIDEO PROCESSING SYSTEMS - DEVELOPMENT OF OPTIMUM WEIGHTED DIGITAL DETECTOR

. NONE

FAA-RD-231-001-02-C
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 405 1 FIELD 9+,12A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR AND BEACON VIDEO PROCESSING SYSTEMS - DEVELOPMENT OF RADAR DIGITAL TRANSFER SYSTEM

. NONE
FAA-RD-231-001-03-C
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 406 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR AND BEACON VIDEO PROCESSING SYSTEMS - DEVELOPMENT OF AZIMUTH PULSE GENERATOR AND AMPLIFIER

. NONE
FAA-RD-231-001-04-C
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 407 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR AND BEACON VIDEO PROCESSING SYSTEMS - RADAR AND BEACON DETECTION SIMULATION STUDIES

. NONE
FAA-RD-231-001-05-R
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 408 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR AND BEACON VIDEO PROCESSING SYSTEMS - PROCUREMENT OF RVDP SPECIAL TEST EQUIPMENT

. NONE
FAA-RD-231-001-06-C
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 409 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR AND BEACON VIDEO PROCESSING SYSTEMS - DEVELOPMENT OF RADAR VIDEO DIGITIZER (RVD), AZIMUTH DIGITIZER (AD)

. NONE
FAA-RD-231-001-07-C
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 410 1 FIELD 17B, 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR AND BEACON VIDEO PROCESSING SYSTEMS - ACCEPTANCE TESTING OF RADAR VIDEO DIGITIZER (RVD) AND AZIMUTH DIGITIZER (AD)

H. L. MCFANN

FAA-RD-231-001-07-X
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

10. Energy Conversion (Non-propulsive)

GNE 235 1 FIELD 10B,20I

GENERAL ELECTRIC CORP, PHILADELPHIA, PENNSYLVANIA

MHD POWER GENERATION

B. ZAUDERER, A. SHERMAN

NR-099-371
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

NIL 88 FIELD 9C, 9+

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, ILLINOIS

STUDY OF THE EFFECTS OF AGE AND VARIATION OF AMBIENT TEMPERATURE ON THE VOLTAGE STABILITY OF UNSATURATED STANDARD CELLS

W. O. RISLEY, H. N. HAYWARD

/65- /

ILLINOIS, UNIVERSITY OF

ZUF 146 1 FIELD 13G, 8D, 8G, 9C

USDI, BUR RECLAM, DENVER, COLORADO

DESIGN OF UNDERGROUND POWERPLANTS

W. H. WOLF, E. D. MORGAN

BR-DD-031
/65- /

INTERIOR-BUREAU OF RECLAMATION

11. Materials

7GX 526 4 FIELD 7D,11F, 8H,11B

HARVARD UNIVERSITY, SCHOOL OF ENGINEERING, SANITARY ENGINEERING, MASSACHUSETTS

MODES OF CORROSION INHIBITION IN NATURAL WATERS
W. STUMM
T-WP-00043-04
9/64- 8/65

PHS-BSS

GH 1445 FIELD 11F

USDC, NATL BUR STAN, DIST OF COLUMBIA

THE MECHANISM OF STRESS CORROSION OF TITANIUM ALLOYS EXPOSED TO SODIUM CHLORIDE AT ELEVATED TEMPERATURES
H. L. LOGAN

NASA-R-130-E-4
5/64- 4/65
NASA

GNE 151 1 FIELD 7D

COMPLEX OXIDIZERS
A. D. MCELROY

NR-093-032
9/64- 8/65
NAVY-OFFICE OF NAVAL RESEARCH

GSE 608 FIELD 11B,20L,10B

LEHIGH UNIVERSITY, SCHOOL OF ENGINEERING, INDUSTRIAL ENGINEERING, PENNSYLVANIA

DEFORMATION BEHAVIOR OF SINTERED CARBIDES UNDER HIGH STRESS AND ELEVATED TEMPERATURES

G. E. KANE, J. D. WOOD

NSF-GK-46
9/64- 9/65

NSF-ENGINEERING SCIENCES DIVISION

GSE 614 1 FIELD 20M,11F,11G,20J

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MIN METAL + PETROL ENG, ILLINOIS

ALLOYS OF TRANSITION ELEMENTS

P. A. BECK
NSF-GK-50
10/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 618 1 FIELD 7D,11F,11G

UNIV OF WISCONSIN, SCHOOL OF ENGINEERING, MINING METALLURGY, WISCONSIN

TRANSGRANULAR STRESS-CORROSION CRACKING OF SOLID SOLUTIONS

R. A. DODD
NSF-GK-45
10/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

ZNE 61 FIELD 11G,13H

USN, OFF NAV RES, NAV RES LAB, DIST OF COLUMBIA

MATERIAL EVALUATION

J. F. DRUMMETER
NR-015-707
7/64- 6/65

NAVY-OFFICE NAVAL RESEARCH

ZPF 469 1 FIELD 20M,11B,11G,11D

US, AEC, BERKELEY, CALIFORNIA

PHYSICAL CERAMICS, RELATION OF STRUCTURE TO PROPERTIES IN CERAMIC SYSTEMS

R. M. FULRATH
/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZPF 471 1 FIELD 20M,11B,11F,11G

US, AEC, BERKELEY, CALIFORNIA

HIGH STRENGTH MATERIALS

E. R. PARKER, V. F. ZACKEY
/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZUG 208 1 FIELD 7D,11F,13H, 7B

USDI, BUR MINES, S.L.C., UTAH

RECOVERY OF RIBIDIUM AND CESIUM

B. H. CLEMMONS, B. *. CLEMMONS
K. C. DEAN, I. L. NICHOLS, D. L. ROCKHOLT
INT-BM-4160-7
/65- /
INTERIOR-BUREAU OF MINES

ZUG 519 1 FIELD 20M,11B,11D,11F

USDI, BUR MINES, ALBANY, OREGON

THORIUM ALLOY SYSTEMS

S. A. OHARE, H. KATO
INT-BM-1886-6
/65- /

INTERIOR-BUREAU OF MINES

ZYA 21129 1 FIELD 11B,11G

USDA, PHILADELPHIA, PENNSYLVANIA

THE DEHYDRATION OF ANIMAL HIDES AND SKINS AFTER TREATMENT WITH AQUEOUS SOLUTIONS OF POLAR ORGANIC COMPOUNDS.

F. P. LUVISI
AG-E-06-04-049
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

ZYA 21130 1 FIELD 11G

USDA, PHILADELPHIA, PENNSYLVANIA

NEW TANNING PROCESSES FOR IMPROVING THE PROPERTIES OF LEATHER.

W. WINDUS
AG-E-06-04-050
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

ZYA 24430 FIELD 11G

USDA, MADISON, WISCONSIN

EVALUATE THE BASIC MECHANICAL AND PHYSICAL PROPERTIES OF PAPER AND FACTORS THAT AFFECT THEM

W. A. CHILSON

AG-FS-03-03-006
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

ZYA 32175 1 FIELD 11G

USDA, NEW ORLEANS, LOUISIANA

MICROSCOPICAL INVESTIGATIONS OF CHEMICAL SUBSTITUTION AND CROSSLINK FORMATION IN COTTON

M. L. ROLLINS, A. T. MOORE
AG-S02-01-263
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

ZYA 32183 1 FIELD 11G, 7B

USDA, NEW ORLEANS, LOUISIANA

IMPROVING WASH-WEAR COTTON FABRICS BY CROSSLINKING FABRICS WOVEN OF PREMERCERIZED YARNS

A. L. MURPHY

AG-S02-01-267
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

ZYA 32194 1 FIELD 7C, 7D,11G, 7B

USDA, OLUSTEE, FLORIDA

PREPARATION AND REACTIONS OF EPOXIDES AND OZONIZATION PRODUCTS OF RESIN ACIDS AND THEIR DERIVATIVES

W. H. SCHULLER

AG-S05-02-052
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

ZYA 32197 1 FIELD 7C,21B, 7D,11G

USDA, OLUSTEE, FLORIDA

IMPROVED POLYESTER RESINS FROM RESIN ACIDS

N. J. HALBROOK

AG-S05-02-053
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

ZYA 32209 1 FIELD 11G

USDA, NEW ORLEANS, LOUISIANA

NEW AND IMPROVED X-RAY DIFFRACTION TECHNIQUES TO STUDY CRYSTALLINE STRUCTURE OF COTTON

J. J. CREELY
AG-S02-01-276
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

12. Mathematical Sciences

1MH 11493 1 FIELD 12A

UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, MATHEMATICS, MICHIGAN

SEQUENTIAL ANALYSIS

R. H. BERK
6/65- 5/66

PHS-NIH-NATL INST MENTAL HEALTH

GH 1432 FIELD 12A

COLORADO STATE UNIV, GRADUATE SCHOOL, MATHEMATICAL STATIST, COLORADO

RESEARCH ON A MODIFIED KUHN-TUCKER THEOREM
K. SEO
NASA-NSG-569-P-3
12/63-11/64

NASA

GPF 922 FIELD 12A

UNIVERSITY OF MARYLAND, SCHOOL OF ENGINEERING, FLUID DYNAM + AP MATH, MARYLAND

STUDIES OF THE NUMERICAL SOLUTION OF ELLIPTIC AND PARABOLIC BOUNDARY VALUE PROBLEMS
B. E. HUBBARD, J. MASON, V. THURAISAMY
AT(40-1)-3443
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

GSM 25 4 FIELD 12A

UNIV OF CAL-L. A., GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

FUNCTIONAL ANALYSIS AND APPLICATIONS
R. F. ARENS

NSF-GP-3594
10/65-10/66
NSF-MATHEMATICAL SCIENCES DIVISION

GSM 122 4 FIELD 12A

PURDUE UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, INDIANA

FUNCTIONAL ANALYSIS
C. GOFFMAN, R. B. DARST, L. DEBRANGES
A. HAYES, M. JERISON, G. L. KRABBE
C. J. NEUGEBAUER
NSF-GP-3515
10/65-10/66

NSF-MATHEMATICAL SCIENCES DIVISION

GSM 160 4 FIELD 12A

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, MATHEMATICS, ILLINOIS

PARTIAL DIFFERENTIAL EQUATIONS
F. E. BROWDER

NSF-GP-3552
11/65-10/66
NSF-MATHEMATICAL SCIENCES DIVISION

13. Mechanical, Industrial, Civil, and Marine Engineering

7GX 138 3 FIELD 13A, 7D, 7B

RUTGERS THE STATE UNIV, GRADUATE SCHOOL, CHEMISTRY, NEW JERSEY

FUNDAMENTALS OF AIR CLEANING BY ADSORPTION PROCESSES

M. J. LOW, M. SHIMIZU

7-AP-00211-03
6/65- 5/66

PHS-BSS

7GX 553 4 FIELD 13B

OKLAHOMA STATE UNIV, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, OKLAHOMA

KINETICS AND MECHANISM IN ACTIVATED SLUDGE PROCESSES

A. F. GAUDY
7-WP-00325-04
9/65- 8/66

PHS-BSS

7GX 577 6 FIELD 13B,12A, 5C

IOWA ST UNIV SCI TECH, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, IOWA

DESIGN REQUIREMENTS FOR MUNICIPAL DIATOMITE FILTERS

P. E. MORGAN, E. R. BAUMANN, T. BESETT
J. L. CLEASBY, K. MERIDETH, L. OLSON
C. S. OULMAN
7-WP-00196-06
10/65- 9/66

PHS-BSS

7GX 600 6 1 FIELD 13B, 5A, 8H

INDIV. GRANT, D. C., DIST OF COLUMBIA

U.S.S.R. LITERATURE ON WATER SUPPLY AND POLLUTION CONTROL

B. S. LEVINE

7-WP-00305-06
4/65-12/65

PHS-BSS

7GX 1242 2 FIELD 8H, 8C,12A, 8E

MANHATTAN COLLEGE, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NEW YORK

ESTUARINE WATER QUALITY AND POLLUTION.

D. J. OCONNOR

7-WP-00677-02
6/65- 5/66

PHS-BSS

7GX 1340 1 FIELD 13B,20D

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, TEXAS

MIXING AND DISPERSION OF CONTAMINANTS IN RESERVOIRS

F. D. MASCH

7-WP-00705-01
9/65- 8/66

PHS-BSS

7GX 1690 3 FIELD 13A,13B

PA DEPT OF HEALTH HA, PENNSYLVANIA

AIR POLLUTION FORECASTING TECHNIQUES FOR PENNSYLVANIA

V. H. SUSSMAN, P. A. LEH, M. W. ZOOK

7-AP-00222-03
4/65- 3/66

PHS-BSS

7GX 1818 2 FIELD 7A, 7D, 8H, 7B

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, TEXAS

MASS TRANSPORT THROUGH MONOLAYERS ON RESERVOIRS

D. M. HIMMELBLAU
7-WP-00652-02
6/65- 5/66

PHS-BSS

7GX 1819 2 FIELD 13B, 7A, 7D

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, CALIFORNIA

UCB-ENG-2233-ORTHOKINETIC FLOCCULATION OF HETERODISPERSED SYSTEMS

W. J. KAUFMAN, H. S. HARRIS

7-WP-00658-02
6/65- 5/66

PHS-BSS

7GX 1830 3 1 FIELD 13A, 5A, 7D, 7A

AMER PUBLIC HEALTH A, NEW YORK

INTERSOCIETY MANUAL OF METHODS FOR AMBIENT AIR SAMPLING AND ANALYSIS

L. GREENBURG, L. *. GREENBURG
G. J. KUPCHIK

7-AP-00256-03-S-1
6/65- 5/66

PHS-BSS

7GX 2817 1 FIELD 13B

CITY, UTILITY DEPT S D, CALIFORNIA

PYROLYSIS OF SOLID MUNICIPAL WASTES

D. A. HOFFMAN, W. M. CONN, R. A. FITZ
F. E. MEYER
7-EF-00746-01
6/65- 5/66

PHS-BSS

7GX 3123 4 FIELD 13B, 7D, 7B

JOHNS HOPKINS UNIV, SCHOOL OF ENGINEERING, SANITARY ENGINEERING, MARYLAND

REDUCING SECONDARY EFFLUENT PHOSPHORUS CONCENTRATION
C. E. RENN, G. M. CORNWALL

7-WP-00099-04
6/65- 5/66

PHS-BSS

7GX 3497 1 FIELD 13B,12A, 5C,13M

UNIV OF CAL-DAVIS, SCHOOL OF AGRICULTURE, AGRIC ENGINEERING, CALIFORNIA

NATIONAL CONFERENCE ON SOLID WASTE MANAGEMENT

S. A. HART, P. H. MCGAUHEY
7-EF-00804-01
7/65- 6/66

PHS-BSS

GFX 84 FIELD 13B, 7D

ILLINOIS INST OF TECH, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

FOAM SEPARATION FOR THE TREATMENT OF LOW-QUALITY WATERS
R. B. GRIEVES

DA-49-193-MD-2629
8/64- 7/65

ARMY-MEDICAL SERVICE

GH 1442 FIELD 20D,10B

IIT RESEARCH INSTITUTE, AT ILL INST OF TECHNOL, ILLINOIS

RESEARCH IN BACKSTREAMING FROM OIL DIFFUSION PUMPS

W. M. LANGDON
NASA-NASR-65-08-E-3
12/63-11/64

NASA

GH 1542 FIELD 13B

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, TEXAS

INVESTIGATE SOIL MODELLING PROBLEMS RELATED TO IMPACT STUDIES

L. REESE

NASA-NSG-604-SI-3
4/64- 3/65

NASA

GNE 2342 FIELD 13J, 8C,20A

BOLT BERANEK AND NEW, MASSACHUSETTS

SUBMARINE NOISE EVALUATION

. NONE
NR-185-101
8/64- 7/65

NAVY-OFFICE OF NAVAL RESEARCH

GR 15

STATE, HOUSING AUTH, ALASKA

THE DESIGN AND DEVELOPMENT OF LOW-COST DWELLINGS SUITABLE FOR A COLD CLIMATE

T. E. ELLIOTT
ALASKA-LIHD-1
/66- /

HOUSING AND HOME FINANCE AGENCY

GR 28

HOUSING RESEARCH INC, INDIANA

THE DESIGN AND ASSEMBLY OF FACTORY-BUILT SECTIONS OF PERMANENT HOUSING TO ACHIEVE A MULTI-LEVELED CLUSTER OF NINE LOW-COST DWELLINGS

M. GOERS
IND-LIHD-2
/66- /

HOUSING AND HOME FINANCE AGENCY

GR 56

USDC, BUR CENSUS, DIST OF COLUMBIA

CRITERIA FOR MEASURING HOUSING QUALITY

. NONE
/66- /

HOUSING AND HOME FINANCE AGENCY

GR 64 FIELD 5A,11G

BATTELLE MEMORIAL IN, OHIO

AN INDUSTRIAL SURVEY OF TECHNOLOGICAL CHANGES EXPECTED TO AFFECT THE HOUSING INDUSTRY DURING THE NEXT TEN YEARS

R. T. LASKO
/66- /

HOUSING AND HOME FINANCE AGENCY

ZTA 316 FIELD 5A

US, SMITHSONIAN INST, DIST OF COLUMBIA

WOODWORKING TOOLS-THEIR CHANGE AND THE MEANING OF THIS CHANGE

P. C. WELSH
/66- /

SMITHSONIAN INSTITUTION

ZTA 318 FIELD 5A

US, SMITHSONIAN INST, DIST OF COLUMBIA
THE IRON BODIED BENCH PLANE-AN AMERICAN CONTRIBUTION TO HAND TOOL DESIGN
P. C. WELSH
/66- /
SMITHSONIAN INSTITUTION

ZUF 25 1 FIELD 13G,12A,20D

USDI, BUR RECLAM, DENVER, COLORADO

PIPELINE AND TUNNEL HYDRAULICS

R. B. DEXTER, D. COLGATE
BR-DR-186
/65- /

INTERIOR-BUREAU OF RECLAMATION

ZUG 88 1 FIELD 13A,13B, 7C, 7D

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

MECHANISMS OF AIR POLLUTION REACTIONS

D. F. DEVER, D. A. DEVER, B. H. ECCLESTON
R. W. HURN, M. L. WHISMAN
INT-BOM-4315
/65- /

INTERIOR-BUREAU OF MINES

ZUG 254 1 FIELD 7D, 8D, 8G

USDI, BUR MINES, TUSCALOOSA, ALABAMA

MICA BENEFICIATION

R. B. ADAIR, J. S. BROWNING
INT-BM-4166-2
/65- /

INTERIOR-BUREAU OF MINES

ZUG 337 1 FIELD 21D, 7D, 8D, 7B

USDI, BUR MINES, SEATTLE, WASHINGTON

DEWATERING FLOTATION TAILING

M. R. GEER, P. S. JACOBSEN
INT-BM-4519
/65- /

INTERIOR-BUREAU OF MINES

ZUG 510 1 FIELD 11F,13H,13I, 5A

USDI, BUR MINES, ALBANY, OREGON

COLD-MOLD INDUCTION MELTING
R. A. BEALL, P. G. CLITES

INT-BM-1886-1
/65- /
INTERIOR-BUREAU OF MINES

ZYA 12180 1 FIELD 13B,11G,20K

USDA, BELTSVILLE AND, HYATTESVILLE, MARYLAND

BUILDING FOUNDATIONS IN EXPANSIVE CLAY SOILS
N. C. TETER, J. A. ANDERSON
AG-AE-8-05-11
/66- /
AGRICULTURE-DEPT OF AGRICULTURE

ZYA 12195 1 FIELD 13M

USDA, BELTSVILLE AND, HYATTESVILLE, MARYLAND

PROTOTYPE LOW-COST HOUSE CONSTRUCTION
N. C. TETER, J. O. NEWMAN

AG-AE-8-05-13
/66- /
AGRICULTURE-DEPT OF AGRICULTURE

14. Methods and Equipment

ZUG 428 1 FIELD 8D, 5A,20H

USDI, BUR MINES, MORGANTOWN, WEST VIRGINIA

MINE DUST METER
R. F. STEWART, J. W. MARTIN
R. A. STEWART
INT-BM-11-4182-9-8
/65- /

INTERIOR-BUREAU OF MINES

ZUH 249 2 FIELD 8H

USDI, FWS, BSFW, BISHOP, CALIFORNIA

A TIME-INTEGRATING ACTINOMETER FOR IN SITU USE IN LAKES AND STREAMS

J. A. MACIOLEK

FR-305-10
/65- /

INTERIOR-BUREAU SPORT FISH WLIFE

ZXM 650035 FIELD 11B,11C

U S PUBLIC HEALTH SERV, MARYLAND

METALLIZING GLASS MICROPIPETTES AND OTHER NONCONDUCTING SURFACES

J. J. LEWIS, A. F. BAK

NIH-INT-M-NP-GN-44
/65- /

PHS-NIH-NATL INST MENTAL HEALTH

17. Navigation, Communications, Detection, and Countermeasures

GSE 703 FIELD 9+

POLYTECH INST BROOKLYN, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW YORK

COMMUNICATIONS VIA RANDOM CHANNELS
M. SCHWARTZ, K. K. CLARKE

NSF-GK-527
7/65- 6/66
NSF-ENGINEERING SCIENCES DIVISION

ZKD 286 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR IMPROVEMENTS - EVALUATION OF RADAR INTERFERENCE EQUIPMENT - EVALUATION OF DUAL DIVERSITY
. NONE
FAA-RD-107-2-V-3
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 287 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR IMPROVEMENTS - EVALUATION OF RADAR INTERFERENCE EQUIPMENT - EVALUATION OF PASSIVE RADAR ENHANCERS
. NONE
FAA-RD-107-2-V-4
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 288 1 FIELD 4B, 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

WEATHER ON THE ATC RADAR DISPLAY - P RODUCTION SPECIFICATIONS/PROCUREMENT - W EATHER ON THE ATC RADAR DISPLAY AND PROTOTYPE FABRICATIO
. NONE
FAA-RD-107-4-0
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 289 1 FIELD 4B, 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

WEATHER ON THE ATC RADAR DISPLAY - E VALUATE WEATHER DISPLAY EQUIPMENT
. NONE
FAA-RD-107-4-V
/65- /
FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 290 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ASDE SYSTEM IMPROVEMENTS

. NONE

FAA-RD-107-7-D
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 291 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ASDE SYSTEM IMPROVEMENTS - E XPERIMENTATION AND TEST OF SOLID STATE DUPLEXER

. NONE

FAA-RD-107-7-X
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 292 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR PERFORMANCE ASSURANCE - ANALYSIS OF ASR, ARSR AND ATCRBS PERFORMANCE ASSURANCE

. NONE

FAA-RD-107-201-S
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 293 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR PERFORMANCE ASSURANCE - FIRST ARTICLE FOR ASR AND ARSR PERFORMANCE ANALYZER/MONITOR EQUIPMENT

. NONE

FAA-RD-107-201-D
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 294 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADAR PERFORMANCE ASSURANCE

. NONE

FAA-RD-107-201-E
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 295 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR - DEVELOP INTERROGATOR AND ASSOCIATED EQUIPMENT - A TCRBS TECHNIQUES INVESTIGATIONS AND THEORETICAL ANALYSIS

. NONE

FAA-RD-108-3-D-1
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 296 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR - DEVELOP INTERROGATOR AND ASSOCIATED EQUIPMENT - T RANSMITTER MODIFICATIONS

. NONE

FAA-RD-108-3-D-2
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 297 1 FIELD 9C, 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR - DEVELOP INTERROGATOR AND ASSOCIATED EQUIPMENT - R OTARY JOINT DEVELOPMENT

. NONE

FAA-RD-108-3-D-3
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 298 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR - DEVELOP INTERROGATOR AND ASSOCIATED EQUIPMENT - B EAM SHARPENING AND CENTER MARK EQUIPMENT DEVELOPMENT

. NONE

FAA-RD-108-3-D-4
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 299 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR - DEVELOP INTERROGATOR AND ASSOCIATED EQUIPMENT - M ILITARY INTERROGATORS

. NONE

FAA-RD-108-3-D-5
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 300 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR - DEVELOP INTERROGATOR AND ASSOCIATED EQUIPMENT - A NTENNA IMPROVEMENTS

. NONE

FAA-RD-108-3-D-6
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 301 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR - DEVELOP INTERROGATOR AND ASSOCIATED EQUIPMENT - B EACON COVERAGE TESTS AT NAFEC

. NONE

FAA-RD-108-3-D-7
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 302 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR - DEVELOP INTERROGATOR AND ASSOCIATED EQUIPMENT - A DVANCED INTERROGATOR

. NONE

FAA-RD-108-3-D-8
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 303 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR - DEVELOP INTERROGATOR AND ASSOCIATED EQUIPMENT - S TORAGE TUBE DEFRUITER

. NONE
FAA-RD-108-3-D-9
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 304 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR

. NONE

FAA-RD-108-3-X
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 305 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR - INTERROGATOR AND ASSOCIATED EQUIPMENT EVALUATION - E VALUATION OF STORAGE TUBE DEFRUITERS

. NONE
FAA-RD-108-3-V-1
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 306 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR - INTERROGATOR AND ASSOCIATED EQUIPMENT EVALUATION - E VALUATION OF ATCRBI-3 EQUIPMENT WITH MODE INTERLACE AND SI

. NONE
FAA-RD-108-3-V-3
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 307 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR - INTERROGATOR AND ASSOCIATED EQUIPMENT EVALUATION - E VALUATION OF ARSR 5-PATH ROTARY JOINT AND ATCRBI-3 (CENTER

. NONE

FAA-RD-108-3-V-4
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 308 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR - INTERROGATOR AND ASSOCIATED EQUIPMENT EVALUATION - E VALUATION OF ASR 4-PATH ROTARY JOINT AND ATCRBI-3 (CENTER

. NONE

FAA-RD-108-3-V-5
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 309 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON INTERROGATOR

. NONE

FAA-RD-108-3-S
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 310 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DEVELOPMENT AND PROTOTYPING OF AN ATCRBS GROUND STATION MONITOR AND TRANSPONDER TEST SET

. NONE

FAA-RD-108-12-D-1
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 311 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DEVELOPMENT AND PROTOTYPING OF AN ATCRBS GROUND STATION MONITOR AND TRANSPONDER TEST SET

. NONE

FAA-RD-108-12-D-2
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 312 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ATCRBS MONITOR AND TEST SET - I NVESTIGATION OF ATCRBS GROUND STATION MONITOR AND TRANSPONDER TEST SET - GROUND STATION MONITOR

. NONE

FAA-RD-108-12-X-1
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 313 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ATCRBS MONITOR AND TEST SET - I NVESTIGATION OF ATCRBS GROUND STATION MONITOR AND TRANSPONDER TEST SET - T RANSPONDER TEST SET

. NONE

FAA-RD-108-12-X-2
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 314 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ATCRBS MONITOR AND TEST SET - COST BENEFIT ANALYSIS OF ATCRBS TRANSPONDER TEST SET

. NONE

FAA-RD-108-12-S
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 315 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON CODE PROCESSORS

. NONE

FAA-RD-108-27-S
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 316 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON CODE PROCESSORS - BEACON CODE PROCESSOR (BCP) DEVELOPMENT - VIDEO PROCESSOR

. NONE

FAA-RD-108-27-D-1
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 317 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON CODE PROCESSORS - BEACON CODE PROCESSOR (BCP) DEVELOPMENT - BEACON VIDEO PROCESSOR EQUIPMENT

. NONE

FAA-RD-108-27-D-2
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 318 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON CODE PROCESSORS - BEACON CODE PROCESSOR (BCP) DEVELOPMENT - DECODING STUDIES

. NONE

FAA-RD-108-27-D-3
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 319 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON CODE PROCESSORS - BEACON CODE PROCESSOR (BCP) DEVELOPMENT - BEACON VIDEO DIGITIZER (BVD) EQUIPMENT

. NONE

FAA-RD-108-27-D-4
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 320 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON CODE PROCESSORS - BEACON CODE PROCESSOR (BCP) DEVELOPMENT - DIGITAL FILTER

. NONE

FAA-RD-108-27-D-6
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 321 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

BEACON CODE PROCESSORS - BEACON CODE PROCESSOR (BCP) DEVELOPMENT - IMPROVED DEGARBLING EQUIPMENT

. NONE

FAA-RD-108-27-D-5
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 322 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

AIRBORNE RADAR BEACON EQUIPMENT

. NONE

FAA-RD-108-30-D
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 323 1 FIELD 13F, 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

AIRBORNE RADAR BEACON EQUIPMENT

. NONE

FAA-RD-108-30-X
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 324 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

AIRBORNE RADAR BEACON EQUIPMENT - G AT/SLATE EVALUATION - GAT EVALUATION - P ART I

. NONE

FAA-RD-108-30-V-1
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 325 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

AIRBORNE RADAR BEACON EQUIPMENT - G AT/SLATE EVALUATION - SLATE EVALUATION - PART II

. NONE

FAA-RD-108-30-V-2
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 326 1 FIELD 9+,22C,12A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ADVANCED DATA ACQUISITION SYSTEM - P OSITION DETERMINATION TECHNIQUE STUDY

. NONE

FAA-RD-110-7-R
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 327 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ADVANCED DATA ACQUISITION SYSTEM

. NONE

FAA-RD-110-7-D
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 328 1 FIELD 9+,22C,12A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ADVANCED DATA ACQUISITION SYSTEM - S YSTEMS ENGINEERING AND COST/BENEFIT ANALYSIS OF ADVANCED DATA ACQUISITION SYSTEM

. NONE

FAA-RD-110-7-S
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 329 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

AIRPORT BLIND SPOT SURVEILLANCE

. NONE
FAA-RD-110-301-D
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 330 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

AIRPORT BLIND SPOT SURVEILLANCE

. NONE
FAA-RD-110-301-V
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 331 1 FIELD 9+, 9A,20C

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADIATION HAZARDS AFFECTING NAS OPERATIONS - DETERMINE CRITERIA TO REDUCE RADIATION HAZARDS

. NONE
FAA-RD-110-302-R
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 332 1 FIELD 9+, 9A,20C

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RADIATION HAZARDS AFFECTING NAS OPERATIONS - INVESTIGATION OF RADIATION HAZARD CRITERIA

. NONE
FAA-RD-110-302-X
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 333 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MILITARY RADAR IN AIR TRAFFIC CONTROL - EVALUATION OF MILITARY RADARS PROPOSED FOR JOINT USE - EVALUATION OF AN/FPS-7 RADAR PROPOSED

. NONE
FAA-RD-110-303-V
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 334 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

CAS/PWI TECHNIQUES - EXPERIMENTATION, TEST GROUND BOUNCE CAS

. NONE
FAA-RD-110-501-X-1
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 335 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

CAS/PWI TECHNIQUES - EXPERIMENTATION, TEST INFRARED PWI

. NONE

FAA-RD-110-501-X-3
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 336 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

CAS/PWI TECHNIQUES - EXPERIMENTATION, TEST TIME ALTITUDE CAS

. NONE

FAA-RD-110-501-X-4
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 339 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

SEPARATION ASSURANCE/PWI TECHNIQUES - SEPARATION MONITOR TECHNIQUES

. NONE

FAA-RD-110-504-R-3
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 341 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

SEPARATION ASSURANCE/PWI TECHNIQUES - EXPERIMENTATION OF SEPARATION ASSURANCE/PWI TECHNIQUES - DYNAMIC AND LIVE TEST OF SEPARATION M

. NONE

FAA-RD-110-504-X-3
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 342 1 FIELD 12A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

SYSTEM CHARACTERISTICS OF A COMPLETE ADSA SYSTEM - COMPUTER STUDY OF ADSA IN MULTIPLE AIRCRAFT ENVIRONMENT

. NONE

FAA-RD-110-517-S
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 343 1 FIELD 12A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

SYSTEM CHARACTERISTICS OF A COMPLETE ADSA SYSTEM - DYNAMIC SIMULATION OF CRITICAL CHARACTERISTICS

. NONE

FAA-RD-110-517-X
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 344 1 FIELD 17B

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

PROCUREMENT SPECIFICATION UPDATING FY-64 - PREPARATION OF ATC DATA ACQUISITION PROCUREMENT SPECIFICATIONS FOR FY 1964

. NONE

FAA-RD-110-70-E
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 345 1 FIELD 17B

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

PROCUREMENT SPECIFICATION UPDATING FY-65 - PREPARATION OF ATC DATA ACQUISITION PROCUREMENT SPECIFICATIONS FOR FY 1965

. NONE
FAA-RD-110-71-E
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 348 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

TELEWALK SYSTEM - DEVELOP TELEWALK SYSTEM

. NONE
FAA-RD-111-7-D
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 349 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

TELEWALK SYSTEM - EVALUATION OF TELEWALK SYSTEM

. NONE
FAA-RD-111-7-V
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 353 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

IMPROVEMENTS TO PRESENT COMMUNICATIONS EQUIPMENT - COORDINATION OF IN-SERVICE IMPROVEMENTS

. NONE
FAA-RD-111-25-S
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 354 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

IMPROVEMENTS TO PRESENT COMMUNICATIONS EQUIPMENT - LOGGING RECORDER

. NONE

FAA-RD-111-25-D-31
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 355 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

IMPROVEMENTS TO PRESENT COMMUNICATIONS EQUIPMENT - MODULAR MONITOR INDICATORS

. NONE

FAA-RD-111-25-D-33
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 356 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

IMPROVEMENTS TO PRESENT COMMUNICATIONS EQUIPMENT - EVALUATION OF IN-SERVICE IMPROVEMENTS - EVALUATION OF MONITOR SYSTEM INDICATORS

. NONE

FAA-RD-111-25-V-1
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 357 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

COMMUNICATION CHANNEL UTILIZATION DETERMINATION - DEVELOP CHANNEL UTILIZATION DATA GATHERING TECHNIQUE

. NONE

FAA-RD-111-27-R
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 358 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

COMMUNICATION CHANNEL UTILIZATION DETERMINATION - COORDINATION OF OVER-ALL EFFORT ON CHANNEL UTILIZATION DETERMINATION

. NONE

FAA-RD-111-27-S
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 359 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

NAS POINT-TO-POINT DATA TRANSFER - F UNCTIONAL SPECIFICATIONS FOR NAS DATA TRANSFER SYSTEM

. NONE

FAA-RD-112-17-S
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 360 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

NAS POINT-TO-POINT DATA TRANSFER - NAS POINT-TO-POINT DATA TRANSFER

. NONE

FAA-RD-112-17-D-21
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 361 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

NAS POINT-TO-POINT DATA TRANSFER - E XPERIMENTATION WITH DATA TRANSFER SYSTEM

. NONE

FAA-RD-112-17-X
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 362 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DATA COMMUNICATION SYSTEM DESIGN - SYSTEM DESIGN OF DATA LINK

. NONE

FAA-RD-112-20-S
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 363 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DATA COMMUNICATION SYSTEM DESIGN - DATA LINK COMPONENT COMPATIBILITY AND MODEL DEVELOPMENT

. NONE

FAA-RD-112-20-D-21
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 364 1 FIELD 9+, 9D,12A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DATA COMMUNICATION SYSTEM DESIGN - DATA LINK EXPERIMENTAL ENVIRONMENT AND TESTING

. NONE
FAA-RD-112-20-X
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 365 1 FIELD 9+, 9D,12A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DIGITAL INPUT/OUTPUT DEVICES - D EVELOPMENT OF INPUT/OUTPUT DEVICES

. NONE
FAA-RD-112-23-D-21
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 366 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DIGITAL INPUT/OUTPUT DEVICES - DATA COMMUNICATIONS INPUT/OUTPUT DEVICES

. NONE
FAA-RD-112-23-X
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 370 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ATC RADAR REMOTING - ENVIRONMENTAL ENGINEERING FOR ATC RADAR REMOTING

. NONE

FAA-RD-112-26-E
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 374 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF VHF/UHF AIR-GROUND RF SYSTEMS - DEVELOP IMPROVED GROUND RADIATING SYSTEM

. NONE

FAA-RD-113-5-D-11
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 375 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF VHF/UHF AIR-GROUND RF SYSTEMS - DEVELOP IMPROVED VHF/UHF GROUND RECEIVERS

. NONE

FAA-RD-113-5-D-12
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 376 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF VHF/UHF AIR-GROUND RF SYSTEMS - MODERNIZATION OF VHF GROUND RECEIVERS
. NONE

FAA-RD-113-5-D-13
/65- /
FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 377 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF VHF/UHF AIR-GROUND RF SYSTEMS - DEVELOP IMPROVED VHF/UHF ANTENNAS
. NONE

FAA-RD-113-5-D-14
/65- /
FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 378 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF VHF/UHF AIR-GROUND RF SYSTEMS - DEVELOP FEASIBILITY MODEL OF STABILIZED MASTER OSCILLATOR
. NONE

FAA-RD-113-5-D-15
/65- /
FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 379 1 FIELD. 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF VHF/UHF AIR-GROUND RF SYSTEMS - RCAG MONITOR SYSTEM

. NONE
FAA-RD-113-5-D-31
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 380 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF VHF/UHF AIR-GROUND RF SYSTEMS - EVALUATION OF IMPROVED VHF/UHF EQUIPMENTS - EVALUATION OF VHF/UHF LOW LEVEL TRANSMI
. NONE

FAA-RD-113-5-V-1
/65- /
FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 381 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF VHF/UHF AIR-GROUND RF SYSTEMS - EVALUATION OF IMPROVED VHF/UHF EQUIPMENTS - EVALUATION OF GROUND RADIATION SYSTEMMM

. NONE
FAA-RD-113-5-V-2
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 382 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF VHF/UHF AIR-GROUND RF SYSTEMS - EVALUATION OF IMPROVED VHF/UHF EQUIPMENTS - EVALUATION OF VHF/UHF RECEIVERS
. NONE

FAA-RD-113-5-V-3
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

207-794 O - 66 - C

ZKD 383 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF VHF/UHF AIR-GROUND RF SYSTEMS - EVALUATION OF IMPROVED VHF/UHF EQ
N. L. BORCHERS

FAA-RD-113-005-04-V
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 384 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF VHF/UHF AIR-GROUND RF SYSTEMS - EVALUATION OF IMPROVED VHF/UHF EQ
. NONE

FAA-RD-113-5-V-5
/65- /
FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 385 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF VHF/UHF AIR-GROUND RF SYSTEMS - EVALUATION OF IMPROVED VHF/UHF EQUIPMENTS - EVALUATION OF MASTER OSCILLATOR SYSTEMS

. NONE
FAA-RD-113-5-V-6
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 386 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

MODERNIZATION OF HF POINT-TO-POINT ANTENNAS - DEVELOP IMPROVED HF ANTENNAS

. NONE
FAA-RD-113-23-D-21
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 387 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

VHF/UHF RADIO RELAY LINK SYSTEMS - D EVELOP IMPROVED RADIO RELAY LINK
. NONE
FAA-RD-113-24-D-11
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 388 1 FIELD 9+

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ADVANCED COMMUNICATION TECHNIQUES - R ESEARCH ON ADVANCED COMMUNICATION SYSTEMS

. NONE
FAA-RD-113-26-R
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 389 1

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

SUPPORT OF ATS/IMS NORTHERN TIER - S UPPORT OF ATS/IMS NORTHERN TIER PROJECT

. NONE

FAA-RD-113-29-S
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 390 1

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

SUPPORT OF ATS/IMS NORTHERN TIER - S UPPORT OF ATS/IMS NORTHERN TIER PROJECT

. NONE
FAA-RD-113-29-X
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 392 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ATC DATA TRANSFER AND COMMUNICATIONS PROCUREMENT SPECIFICATIONS FOR FY-1966 - PREPARATION OF ATC DATA TRANSFER AND COMMUNICATIONS

. NONE
FAA-RD-113-70-E
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 393 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

LONG RANGE A/G RF SYSTEMS - LONG RANGE VHF DEVELOPMENT

D. T. GRANN
FAA-RD-221-120-01-C
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

ZKD 394 1 FIELD 9+, 9A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

LONG RANGE A/G RF SYSTEMS - LONG RANGE VHF EXPERIMENTATION

L. PEARSON
FAA-RD-221-120-01-X
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

18. Nuclear Science and Technology

GNE 2399 4 FIELD 18A

NORTH AMER AVIATION, CANOGA PARK, CALIFORNIA

DIRECT CONVERSION REACTOR STUDY

R. C. ALLEN

NR-090-346
9/64- 8/65

NAVY-OFFICE OF NAVAL RESEARCH

GPE 24 4 FIELD 19D, 7D,12A, 8E

USN, BUR SHIPS, SAN FRANCISCO, CALIFORNIA

THE FORMATION, DISTRIBUTION AND CHARACTERISTICS OF RADIOACTIVE FALLOUT - PREDICTION OF RADIOLOGICAL PROPERTIES

G. R. CROCKER, M. A. CONNORS, T. TURNER

AT-49-7-1963
7/64- 6/65

AEC-BIOLOGY + MEDICINE

GPE 612 2 FIELD 7D,19D,12A, 8E

TEX. INSTR., INC., D, TEXAS

FALLOUT STUDIES BY FIELD TOTAL ABSORPTION GAMMA RAY SPECTROSCOPY

R. S. FOOTE, N. B. HUMPHREY

AT-40-1-3147
10/64- 9/65

AEC-BIOLOGY + MEDICINE

GPF 578 1 FIELD 5A,18A, 7D,20L

UNIVERSITY OF OREGON, GRADUATE SCHOOL, PHYSICS, OREGON

NUCLEAR PHYSICS RESEARCH

B. GRASEMANN, J. L. BINNEY, S. D. CLOUD
J. C. COOPER, P. A. DEUTSCHMAN
K. W. DOLAN, H. W. LEFEVRE

AT-45-1-1925
6/65- 5/66

AEC-DIVISION OF PHYSICAL RES

GSE 746 FIELD 18A, 7D, 8B

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, MASSACHUSETTS

NUCLEAR ENGINEERING RESEARCH AT THE ROCKEFELLER GENERATOR

S. WILENSKY, F. M. CLIKEMAN

NSF-GK-654
10/65- 9/66

NSF-ENGINEERING SCIENCES DIVISION

ZPE 840 FIELD 18G, 8H, 8G, 7B

US AEC O R N L, ONAL LAB, TENNESSEE

ENVIRONMENTAL RADIATION STUDIES - E VALUATION OF FISSION PRODUCT DISTRIBUTION AND MOVEMENT IN TERRESTRIAL ENVIRONMENTS

F. L. PARKER, T. F. LOMENICK
W. M. MCMASTER, R. M. RICHARDSON
T. TAMURA
/65- /

AEC-BIOLOGY + MEDICINE

20. Physics

1DE 1804 3 FIELD 7D,20M,20L, 7B

UNIV OF PENNSYLVANIA, SCHOOL OF ENGINEERING, METALLURGICAL ENGIN, PENNSYLVANIA
MEASUREMENT OF SURFACE ENERGY DISTRIBUTION ON SOLIDS
P. DUBY, L. A. GIRIFALCO
6/65- 5/66

PHS-NIH-NATL INST DENTAL RESEARCH

1GM 12253 1 FIELD 20J, 5A,20L

STATE UNIV N Y STONY, UNDERGRADUATE SCHOOL, PHYSICS, NEW YORK
EXCITATION TRANSFER IN CRYSTALS AND POLYMERS
D. FOX
6/64- 5/65

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

1GM 12253 2 FIELD 7C, 7D,20M,20J

STATE UNIV N Y STONY, GRADUATE SCHOOL, PHYSICS, NEW YORK
EXCITATION TRANSFER IN CRYSTALS AND POLYMERS
D. FOX
6/65- 5/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

7GX 1174 2 FIELD 13G,20D

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, HYDRAULICS, NEW YORK
SETTLING VELOCITIES OF PARTICLES SUSPENDED IN A TURBULENT ENVIRONMENT
J. A. LIGGETT, W. H. GRAF, J. R. REED
7-WP-00605-02
6/65- 5/66 PHS-8SS

7GX 1450 6 FIELD 13A,13B,20M, 4B

COLORADO STATE UNIV, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, COLORADO

DIFFUSION IN TURBULENT SHEAR FLOWS WITH THERMAL STRATIFICATION
J. E. CERMAK, L. V. BALDWIN, E. J. PLATE E. REITER

7-AP-00091-06
4/65- 3/66

PHS-BSS

7GX 1653 1 FIELD 7D,20J, 5A,20F

FAIRLEIGH DICKINSON, GRADUATE SCHOOL, MATHEMATICS, NEW JERSEY

PARTICLE AGGLOMERATION USING LASERS
P. COOPERMAN, G. COURVILLE, P. WALSH

7-ES-00110-01
6/65- 5/66

PHS-BSS

GAK 1579 2 FIELD 7C,19D, 7A, 7D

OHIO STATE UNIVERSITY, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, OHIO

RESEARCH STUDIES ON THE FLUID DYNAMICS OF HIGH ENTHALPY FLOW
R. EDSE

AF-33-657-8951
1/65-12/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GAK 1647 FIELD 20C,20I,20L

UNIVERSITY OF OKLAHOMA, GRADUATE SCHOOL, PHYSICS, OKLAHOMA

RESEARCH ON THE OPTICAL PROPERTIES OF MATTER
R. G. FOWLER

AF-29-601-6020
6/64- 5/65

AIR FORCE-OFFICE AEROSPACE RESEARCH

GH 417 1 FIELD 11F,11G

FRANKLIN INSTITUTE, PENNSYLVANIA

AN INVESTIGATION OF THE EFFECT OF NUCLEATION OF SLIP AT THE SURFACE ON THE FLOW AND FRACTURE OF BERYLLIUM

K. U. SNOWDEN
NASA-NASR-145-E-4
11/63-12/64

NASA

GH 470 FIELD 7D, 7C, 7A,20J

GEORGE WASHINGTON UNIV, GRADUATE SCHOOL, CHEMISTRY, DIST OF COLUMBIA

SYNTHESIS AND SPECTROSCOPIC PROPERTIES OF RARE EARTH CHELATES IN SOLVENTS AND POLYMERS FOR OPTICAL MASERS
N. FILIPESCU

NASA-NSG-603-P-2
4/64- 3/65

NASA

GH 663 1 FIELD 7C,20M,20J

GLASS TRANSITION PHENOMENA

R. SIMHA
NASA-NSG-343-P-2
12/63-11/64

NASA

GH 775 2 FIELD 8G,12A,13M,20L

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

THEORETICAL AND EXPERIMENTAL INVESTIGATIONS IN NON-LINEAR ELASTICITY

F. JOHN, R. DICKEY, E. REISS, C. SENSENIG

J. J. STOKER, J. WOLKOWISKY

NASA-NSG-412-E-5
5/65- 4/66

NASA

GH 1405 FIELD 20J, 5A

BRANDEIS UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

THEORETICAL RESEARCH IN STATISTICAL MECHANICS WITH APPLICATION TO ROTATION PHENOMENA

D. L. FALKOFF

NASA-NSG-612-P-1
5/64- 4/65

NASA

GH 1406 FIELD 20J, 5A,18A

UNIVERSITY OF ARIZONA, GRADUATE SCHOOL, PHYSICS, ARIZONA

OPERATION OF A 2MV VAN DE LA GRAAFF ACCELERATOR FOR BASIC EXPERIMENTS IN ATOMIC OPTICAL SPECTROSCOPY

S. BASHKIN

NASA-NSG-628-P-1
5/64- 5/65

NASA

GH 1424 FIELD 18A, 7D

USN, BUR SHIPS, SAN FRANCISCO, CALIFORNIA

ELECTRONIC SCATTERING DATA ANALYSIS

W. E. KREGER

NASA-R-142-P-1
5/64- 4/65

NASA

GH 1452 FIELD 11G

SYRACUSE UNIVERSITY, SCHOOL OF ENGINEERING, CHEMICAL + METAL ENGIN, NEW YORK

RESEARCH ON CREEP AT ELEVATED TEMPERATURES AND HIGH VACUUM
K. SCHRODER

NASA-NSG-619-E-5
5/64- 4/65

NASA

GH 1457 FIELD 20L

NORTHWESTERN UNIV, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

STABILITY NONCONSERVATIVE SYSTEMS

G. HERRMANN

NASA-NSG-605-E-6
4/64- 3/65

NASA

GNE 84 4 FIELD 5A,20J

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, PHYSICS, MICHIGAN

THEORETICAL PHYSICS

K. M. CASE

NR-024-430
10/64- 9/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 412 3 FIELD 20H

SPACE TECHNOLOGY LABS, LOS ANGELES, CALIFORNIA

SPINNING PARTICLES
H. C. CORBEN

NR-013-110
12/64-11/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 556 3 FIELD 5A, 7D

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, PHYSICS, MARYLAND

EXPERIMENTAL STUDY OF THE STRUCTURE OF LIGHT NUCLEI

H. D. HOLMGREN, C. A. LUDEMANN
NR-024-401
1/65-12/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 618 2 FIELD 20J, 5A

DOW CHEM CO, MICHIGAN

MASS SPECTRA KINETICS

R. DIESEN, W. J. FELMLEE

NR-092-514
9/64- 8/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 640 4 FIELD 12A,13M,20D,20K

COLUMBIA UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NEW YORK

STRUCTURAL EFFECTS OF TIME DEPENDENT LOADINGS

R. A. BOLEY

NR-064-401
1/65-12/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 1152 2 FIELD 20D,20I

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, AEROSPACE ENGINEERING, NEW YORK

STRONG SHEAR WAVES

E. L. RESLER

NR-061-019
1/65-12/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 1239 1 FIELD 11B,11G,20J,20L

CORNING GLASS WORKS, NEW YORK

GLASS LASER MATERIALS

R. D. MAURER, N. F. BORRELLI, J. DENNIS
S. D. SIMS, N. SOLIMENE, G. E. STONG
M. E. VANCE

NR-017-702
1/64- 6/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 1716 4 FIELD 5A,20L

UNIVERSITY OF ILLINOIS, GRADUATE SCHOOL, PHYSICS, ILLINOIS

SOLID STATE THEORY

F. SEITZ

NR-017-413
9/64- 8/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 1789 4

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CERAMIC ENGINEERING, ILLINOIS

FERROELECTRIC STUDIES
V. J. TENNERY, A. L. FRIEDBERG

NR-032-467
6/65- 5/66

NAVY-OFFICE OF NAVAL RESEARCH

GNE 2471 FIELD 12A,20F,20J,20A

CAL INST OF TECHNOLOGY, GRADUATE SCHOOL, APPLIED MATHEMATICS, CALIFORNIA

WAVE PROPAGATION AND PERTURBATION TECHNIQUES

G. B. WHITHAM
NR-041-314
11/64-10/65

NAVY-OFFICE OF NAVAL RESEARCH

GPF 47 3 FIELD 18A,20H, 7D

IIT RESEARCH INSTITUTE, AT ILL INST OF TECHNOL, ILLINOIS

ANGULAR MOMENTUM EFFECTS ON GAMMA EMISSION

D. SPERBER
AT-11-1-578
9/65- 9/66

AEC-DIVISION OF PHYSICAL RES

GPF 468 4 FIELD 20M,20C, 5A,20L

WEST VIRGINIA UNIV, GRADUATE SCHOOL, PHYSICS, WEST VIRGINIA

VOLUME MAGNETOSTRICTION IN FERROMAGNETIC MATERIALS
A. S. PAVLOVIC

AT-40-1-2839
9/65- 8/66
AEC-DIVISION OF PHYSICAL RES

GPF 739 3 FIELD 5A

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, ENGIN PHYS + MAT SCI, NEW YORK

IMPERFECTIONS IN CRYSTALS AS MEASURED BY INTERNAL FRICTION AND OTHER METHODS

H. S. SACK, H. BOGARDUS
AT-30-1-2471
10/65- 9/66

AEC-DIVISION OF PHYSICAL RES

GPF 828 FIELD 20M,20J, 5A,20F

CORNELL UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW YORK

EXPERIMENTAL AND THEORETICAL PHONON PHYSICS - EXPERIMENTAL PHONON PHYSICS -

R. POHL, J. P. HARRISON, V. NARAYANAMURTI S. J. ROGERS, A. J. SIEVERS

AT-30-1-2391
4/65- 3/66

AEC-DIVISION OF PHYSICAL RES

GPF 873 FIELD 20M,11B,11F,11G

UNIV OF ROCHESTER, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, NEW YORK

SHALLOW DONORS IN SILICON

T. G. CASTNER

AT-30-1-3388
5/65- 5/66

AEC-DIVISION OF PHYSICAL RES

GPF 880 FIELD 20J,20C, 5A,20F

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MARYLAND

APPLICATIONS OF LIGHT SCATTERING TO PLASMA DIAGNOSTICS
H. R. GRIEM, A. W. DESILVA, H. J. KUNZE
AT-40-1-3393
4/65- 3/66
AEC-DIVISION OF PHYSICAL RES

GPF 901 FIELD 5A,18A, 7D, 7B

GEORGETOWN UNIVERSITY, GRADUATE SCHOOL, PHYSICS, DIST OF COLUMBIA

NUCLEAR STRUCTURE + INTERACTION STUDIES WITH A LOW-ENERGY PUSITIVE ION ACCELERATOR
J. M. LAMBERT, L. W. CHIAO, P. A. TREADO
AT-40-1-3412
9/65- 7/66
AEC-DIVISION OF PHYSICAL RES

GPF 906 FIELD 20F,20I,20J

YALE UNIVERSITY, SCHOOL OF ENGINEERING, ENGINEERING + APPL SCI, CONNECTICUT

A REVIEW OF KINETIC THEORY OF WAVES IN A PLASMA IN AN EXTERNAL MAGNETIC FIELD

I. B. BERNSTEIN, M. P. WEENINK
AT-30-1-3568
6/65- 9/66

AEC-DIVISION OF PHYSICAL RES

GPF 910 FIELD 5A,18A,20H

UNIV OF CAL-RIVERSIDE, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

HIGH ENERGY PHYSICS

W. H. BARKAS, R. B. BACASTOW, A. S. CARY C. A. CRUMMER, R. J. DUCOT, K. DUFF J. E. EHNI

AT-11-1-34-107-B
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

GPF 911 FIELD 5A,18A,20H

UNIV OF CAL-RIVERSIDE, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

HIGH ENERGY PHYSICS - TASK B - PROGRAM A

W. H. BARKAS, A. S. CARY, K. DUFF J. E. EHNI, D. T. GREGORICH, C. H. HUU R. T. PU

AT-11-1-34-107-B
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

GPF 912 FIELD 5A,18A,20H

UNIV OF CAL-RIVERSIDE, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

HIGH ENERGY PHYSICS - TASK B - PROGRAM B

W. H. BARKAS

AT-11-1-34-107-B
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

GPF 913 FIELD 5A,18A,20H

UNIV OF CAL-RIVERSIDE, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

HIGH ENERGY PHYSICS - TASK B - PROGRAM C

W. H. BARKAS, R. B. BACASTOW C. A. CRUMMER, R. J. DUCOT, W. C. JACKSON R. J. QUIGLEY

AT-11-1-34-107-B
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

21. Propulsion and Fuels

7GX 1828 6 FIELD 21B,21D, 7D, 7B

CAL INST OF TECHNOLOGY, SCHOOL OF ENGINEERING, CHEMISTRY + CHEM ENGIN, CALIFORNIA

FORMATION OF OXIDES OF NITROGEN DURING COMBUSTION

B. H. SAGE, H. H. REAMER, R. C. SEAGRAVE

7-AP-00107-06
6/65- 5/66

PHS-BSS

GNE 61 4 FIELD 21B,21I,10B

PRINCETON UNIVERSITY, SCHOOL OF ENGINEERING, AERONAUTICAL ENGIN, NEW JERSEY

SOLID PROPELLANT BURNING

M. J. SUMMERFIELD

NR-098-201
10/64- 9/65

NAVY-OFFICE OF NAVAL RESEARCH

GNE 62 3 FIELD 21B

STANFORD RESEARCH INST, MENLO PARK, CALIFORNIA

FUNDAMENTALS OF IGNITION

H. WISE

NR-092-507
10/64- 9/65

NAVY-OFFICE OF NAVAL RESEARCH

ZUG 319 2 FIELD 21D, 7D, 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

PREPARATION CHARACTERISTICS OF COKING COALS

W. H. OPPELT, A. W. DEURBROUCK

INT-BM-4179-1
/65- /

INTERIOR-BUREAU OF MINES

22. Space Technology

GH 86 2 FIELD 17G, 9+

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, MASSACHUSETTS

THEORETICAL AND EXPERIMENTAL INVESTIGATIONS FOR LONG-TERM EARTH-ORBITING AND INTERPLANETARY SPACE CRAFTS

W. R. MARKEY
NASA-NSG-254-E-6
9/64- 8/65

NASA

GH 1550 FIELD 22B,22A, 3B,20F

UNIVERSITY OF ARIZONA, GRADUATE SCHOOL, ASTRONOMY, ARIZONA

STUDY OF LARGE OPTICAL TELESCOPE SYSTEMS SUITABLE FOR USE WITH MANNED SPACE SYSTEMS
A. B. MEINEL, W. G. TIFFT

NASA-NSG-732-50-1
6/64- 1/65

NASA

TECHNICAL ABSTRACT BULLETIN

Field 1-AERONAUTICS

1/1. AERODYNAMICS

AD-626 655 Fld. 1/1, 1/3
CFSTI Prices: HC $2.00 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C AERODYNAMICS LAB
LEADING-EDGE WEDGES TO REDUCE THE DRAG OF THICK WINGS AT SUPERSONIC SPEEDS AND TO INCREASE LIFT AT LOW SPEEDS,
by Richard M. Hartley, Roger J. Furey, and Robert P. Letendre, Jr., Aug 65, 36p. Rept. no. Aero-1094
DTMB 2102

Unclassified report

Descriptors: (*Wings, Leading edge), (*Leading edge, Wedges), (*Wedges, Leading edge), Supersonic airfoils, Drag, Subsonic characteristics, Lift, Airfoils, Camber, Angle of attack

An unswept 12-percent-thick wing panel (NACA 0012 section) was tested with a wedge protruding from the blunt leading edge to determine if wing drag could be reduced and lift-to-drag ratio improved at a supersonic airspeed (Mach number 1.87). The wing and wedge were also tested at low subsonic airspeeds to determine if a slat effect existed which would increase maximum lift. At the supersonic airspeed, the wedge reduced the drag of the plain wing by as much as 29 percent at low angles of attack. At higher angles, this drag reduction vanished but the wedge still increased the maximum ratio of lift to drag by as much as 20 percent. At low speeds, a wedge slat increased maximum lift by as much as 54 percent. A small cambered airfoil slat (with a somewhat larger chord than the wedge) was able to increase maximum lift by 72 percent. (Author)

AD-627 112 See Fld. 20/4

1/2. AERONAUTICS

AD-627 132 Fld. 1/2
CFSTI Prices: HC $2.00 MF $0.50
ARMY TRANSPORTATION RESEARCH COMMAND FORT EUSTIS VA
PRELIMINARY FLIGHT TEST DATA UH-2A JET AUGMENTED RESEARCH HELICOPTER MANEUVERABILITY AND DYNAMIC STABILITY EVALUATION.
Interim rept. no. 10.
Jan 65, 43p.

Unclassified report

Descriptors: (*Helicopters, Handling), Maneuverability, Stability, Flight testing, Thrust augmentation, Stalling, Jet engines

The report describes and presents the results of a flight research program to investigate the effect of horizontal thrust augmentation from an auxiliary jet engine on the maneuverability and dynamic stability of the UH-2 helicopter. The effect of transient and steady state load factors on the airspeed envelope, as limited by retreating blade stall, was examined for three values of thrust augmentation. The onset of blade stall is shown to be delayed to higher airspeed by the application of thrust augmentation; the extent of the delay increases with load factor. For a given amount of thrust augmentation, the load factor in transient maneuvers is shown to be higher than for steady accelerated flight conditions. The dynamic response of the helicopter in pitch and yaw to simulated gust inputs was examined for various combinations of thrust augmentation and airspeed. Thrust augmentation tends to decrease control sensitivity and to provide increased damping about both pitch and yaw axes following a disturbance. Qualitative pilot opinion indicates that the helicopter is generally easier to fly as thrust augmentation is added. (Author)

AD-627 133 Fld. 1/2
CFSTI Prices: HC $2.00 MF $0.50
ARMY TRANSPORTATION RESEARCH COMMAND FORT EUSTIS VA
PRELIMINARY FLIGHT TEST DATA UH-1B HIGH PERFORMANCE HELICOPTER.
Interim rept. no. 5.
Nov 64, 33p.

Unclassified report

Descriptors: (*Helicopters, Flight testing), Helicopter rotors, Rotor blades (Rotary wings), Trailing edge, Performance (Engineering)

This report presents the results of flight investigations conducted in association with the primary flight test investigation of the high performance UH-1 helicopter. Results reported include main rotor blades with inboard trailing edge flaps, a two-bladed flex beam rotor, and tapered tip main rotor blades.

AD-627 162 See Fld. 5/9

AD-627 262 See Fld. 20/4

1/3. AIRCRAFT

AD-626 923 Fld. 1/3, 5/2
CFSTI Prices: HC $3.00 MF $0.75
SYSTEMS TECHNOLOGY INC INGLEWOOD CALIF
FLIGHT CONTROL DATA AND INFORMATION EXCHANGE PROGRAM. PART I. INVESTIGATION OF NEED AND FEASIBILITY.
Rept. for Jun 64-Apr 65,
by H. E. Dye, C. E. Bloomquist, and C. H. Wilmot. Nov 65, 58p. Contract AF33 (615)-1818
Proj. AF-8219 Task 821904
AFFDL TR-65-120-Pt-1

Unclassified report

Prepared in cooperation with Planning Research Corp., Los Angeles, Calif., PRC-R-606.

Descriptors: (*Flight control systems, Documentation), Feasibility, Dissemination, Data, Abstracts, Reports

The document reports the results of an investigation of the need for a permanent flight control data and information exchange program. Direct mail questionnaires were used to solicit the opinions of flight control specialists. The results of the opinion survey are summarized. Three major abstracting and announcement media were critically examined from the standpoint of identifying information relevant to flight control systems. A literature survey was also conducted to determine the current status of technical documentation and dissemination. A group of specialized information centers of interest to flight control specialists are described. Based upon the findings, the general structure and guidelines are presented for a specialized information center designed solely to satisfy the information needs of flight control specialists. (Author)

AD-627 089 Fld. 1/3, 17/9, 11/4
CFSTI Prices: HC $2.00 MF $0.50
BRUNSWICK CORP MARION VA DEFENSE PRODUCTS DIV
FINAL ENGINEERING REPORT, 16 MARCH 1964 TO 1 SEPTEMBER 1965,
by J. F. Morrell, R. S. Ebert, and J. F. Phillips. 27 Sep 65, 28p. Contract NOw-64-0351-f

Unclassified report

Descriptors: (*Radomes, Airplane noses), (*Composite materials, Radomes), (*Sandwich construction, Honeycomb cores), Glass textiles, Plastics, Wire, Structural properties, Electrical properties, Performance (Engineering), Filament wound construction, Structural shells, Bonding

A study was made of the A-6A (A2F-1) Nose Radome, with the objective of obtaining structural improvements. Following an initial materials investigation, one radome was fabricated using a wire grid honeycomb composite bonded to the interior of the half-wave wall shell. Structural tests show that improvements in the radome may be obtained through use of this concept. (Author)

AD-627 252 Fld. 1/3
CFSTI Prices: HC $1.00 MF $0.75
DEPARTMENT OF THE NAVY WASHINGTON D C
FLYING CROSS-COUNTRY VEHICLE,
by N. I. Nikolaev. 1963, 118p. Rept. no. Translation 1068
TT 66-60395

Unclassified report

Trans. of mono. Letayushchii Vezdekhod (USSR) Moscow, 1963 103p.

Descriptors: (*Ground effect machines, Reviews), Flight, Theory, Aerodynamics, Ground effect, Annular nozzles, Maneuverability, Stability, Water waves, USSR

The pamplet based on material published in the Western press, describes the principle of flight on an air cushion, classifies the various types of craft and explains the basic theory, to permit a rough determination of basic characteristics of these machines to be made, in order to be able to compare them with other means of transportation. The pamphlet also presents some schematic view and descriptions of some of the completed machines. The pamphlet is written for the information of a wide circle of readers interested in the evolution of air, marine and land transportation and acquainted with mechanics and mathematics of the intermediate school level.

AD-626 655 See Fld. 1/1

AD-626 991 See Fld. 9/5

AD-627 250 See Fld. 13/10

1/4. AIRCRAFT FLIGHT INSTRUMENTATION

AD-626 657 Fld. 1/4, 17/7
CFSTI Prices: HC $2.00 MF $0.50
KAISER AEROSPACE AND ELECTRONICS CORP PALO ALTO CALIF ELECTRONICS PLANT
EXPERIMENTAL EVALUATION OF HEAD-UP DISPLAY HIGH BRIGHTNESS REQUIREMENTS.
Technical rept.,
by Charles R. Kelley, James M. Ketchel, and Peter H. Strudwick. Nov 65, 32p. Rept. no. HFR-9765-1
Contract AF33 (675)-8260

Unclassified report

Descriptors: (*Display systems, Flight instruments), (*Flight instruments, Display systems), Mission profiles, Optical images, Windshields, Visual perception, Pilots, Human engineering, Optics, Feasibility studies, Navigational aids

The HUD, or Head-up part of Kaiser's Vertical/Head-up Display, is an avionics device that collimates and projects symbology onto the real world

at infinity. It enables a pilot to look through the aircraft windscreen while viewing command and status information without requiring visual accommodation changes. This experiment was undertaken to determine what symbol brightness is required to use the Head-up Display under high background brightness conditions. The anticipated worst situation (other than looking directly into the sun) consists of flight over sunlit clouds or snow, in which case there could be continuing background brightnesses on the order of 10,000 foot lamberts against which the display must be seen. Results indicate that pilots will want display contrasts of at least 20 to 35 per cent, i.e., perhaps 1800 to 3500 ft. L. display brightness reflecting from the HUD combining glass, assuming 90 per cent transmission by windscreen and combining glass and an external background luminance of 10,000 ft. L. The minimum brightness contrast for a barely visible, near-threshold display is on the order of 10 per cent, or 900 to 1,000 ft. L. reflected from the combiner. This will provide an extremely dim display, but one that most pilots can be expected to see more than 90 per cent of the time. (Author)

AD-627 241 Fld. 1/4, 14/2
CFSTI Prices: HC $1.00 MF $0.50
LINK GROUP GENERAL PRECISION INC BINGHAMTON N Y
SYNTHESIZED INSTRUMENT EVALUATION.
Rept. for 1 Mar-30 Apr 65,
by Joseph A. Berfanger. Sep 65, 19p. Contract AF33(615)-2895 Proj. AF-6190 Task 619004 AFFDL TR-65-147
Unclassified report

Descriptors: (*Flight instruments, Design), (*Display systems, Flight instruments), Photographic techniques, Photographic equipment, Simulation

The Photographic Instrument Synthesizer System was developed within the Simulation Facility of the Flight Dynamics Laboratory to provide an economical approach to the evaluation of new concepts in aircraft instrument design. The Synthesizer System can present these concepts in the form of a 16 mm movie and thereby reduce the need for prototype equipment. Artwork is used to represent the display elements of an instrument under consideration; several elements can be combined through multiple-exposure techniques. This report reviews the first two films produced with the Instrument Synthesizer; they pertain to two methods of displaying small changes in aircraft pitch angle. The first film concerns the feasibility of inscribing fine lines across the face of the standard Attitude Indicator to produce a strobe effect as the indicator moves through a small angle. The information gained from this film was subsequently incorporated in the design of an operational instrument. The second film was produced as a documentary film for presentation to the AIAA Conference in Dayton, Ohio; supporting scenes of the sequence of steps in the overall operation of the Synthesizer system were included to supplement the study of the small pitch angle display problems associated with an Attitude Indicator using an electron luminescent panel to replace the standard ball. Widely spaced lines on the face of the instrument were driven as a function of altitude to display the result of a change in pitch angle. This display is most effective in the portion of the instrument above its horizon reference line. (Author)

AD-626 653 See Fld. 14/3

AD-627 259 See Fld. 9/1

1/5. AIR FACILITIES

AD-626 944 Fld. 1/5, 11/2, 13/3
CFSTI Prices: HC $3.00 MF $0.75
OHIO RIVER DIV LABS CINCINNATI
DESIGN AND CONSTRUCTION REPORT PRESTRESSED CONCRETE PAVEMENT TAXIWAY T-3, BIGGS AFB, TEXAS,
by Carl F. Renz, and Frank H. Williams. Jun 61, 69p. Rept. no. TR-4-20
Unclassified report

Descriptors: (*Reinforced concrete, Runways), (*Runways, Reinforced concrete), Reinforcing materials, Landing fields, Pavements, Maintenance, Design, Construction, Foundations (Structures), Aging (Materials)

The design and construction of a 9-inch thick prestressed concrete section in an airfield taxiway is reported. The 75 by 1550-foot pavement contains three 500-foot long prestressed items with appurtenant grade beams and overlay slabs at the ends of each item. The post-tensioning method, using tendons made of a group of 1/4-inch button-headed high tensile strength steel wires, was used to prestress the pavement items. The longitudinal and transverse prestress for all items was 350 and 175 psi respectively. The report presents information on features of the design and construction of the pavement and the foundation under the pavement. (Author)

AD-627 045 Fld. 1/5, 11/2, 13/2
CFSTI Prices: HC $4.00 MF $0.75
OHIO RIVER DIV LABS MARIEMONT RIGID PAVEMENT LAB
CHANNELIZED TEST TRACKS, SHARONVILLE, OHIO. REPORT OF CONSTRUCTION.
Technical rept.
Mar 57, 117p. Rept. no. TR-4-7
Unclassified report

Descriptors: (*Pavements, Landing fields), (*Concrete, Runways), (*Runways, Concrete), Tests, Reinforced concrete, Reinforcing materials, Traffic, Wear resistance, Construction, Performance (Engineering)

The need for verification of criteria for the design of airfield pavements subjected to channelized traffic resulted in the construction of two test tracks at Sharonville, Ohio during the winter of 1955-1956. Part 1 is a Test Track, 25-feet wide and 605-feet long, built on a low bearing value subgrade and consists of three plain concrete Items and six reinforced concrete Items for test. Part 2 is a Test Track 25feet wide and 545-feet long, built on a high bearing value subgrade and contains three plain concrete items and five reinforced concrete Items for test. This report presents complete construction data, results of subgrade tests, tests on concrete beams, thickness measurements and recommended values to use in analyzing traffic data at a later date. Representative photographs are appended. (Author)

AD-626 980 See Fld. 11/7

Field 2-AGRICULTURE

2/1. AGRICULTURAL CHEMISTRY

AD-626 792 See Fld. 7/3

Field 3-ASTRONOMY AND ASTROPHYSICS

3/1. ASTRONOMY

AD-626 687 Fld. 3/1
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
AN INTRODUCTION TO THE MOON.
by John W. Salisbury. Jul 60, 34p. Rept. no. AFCRL-TN-60-456
Unclassified report

Descriptors: (*Moon, Astronomical data), Handbooks, Theory, Physical properties

The present knowledge and theories concerning the origin of the moon and lunar surface structures is summarized in layman's language for use primarily by schools and teachers.

AD-626 698 Fld. 3/1
RAND CORP SANTA MONICA CALIF
MEAN DIAMETERS AND ECCENTRICITIES OF ELLIPTICAL GALAXIES,
by Dominic G. B. Edelen. 9 Jul 65, 3p. Rept. no. P-3174
Unclassified report

Availability: Published in The Astronomical Journal v70 n9 p747-8 Nov 1965. Copies to DDC users only.

Descriptors: (*Galaxies, Geometric forms), Celestial mechanics, Analytic geometry, Astronomy

The sample of elliptical galaxies reported in the Reference Catalogue of Bright Galaxies (de Vaucouleurs) is used to confirm the theoretical prediction that the mean diameters of ellipticals are a decreasing function of the eccentricity epsilon for epsilon >0.55. (Author)

AD-627 015 See Fld. 8/4

AD-627 070 See Fld. 8/4

3/2. ASTROPHYSICS

AD-626 672 Fld. 3/2
CALIFORNIA UNIV BERKELEY SPACE SCIENCES LAB
QUASI-STATIONARY COROTATING STRUCTURE IN THE INTERPLANETARY MEDIUM.
Revised ed.,
by John M. Wilcox, and Norman F. Ness. 31 Aug 65, 14p. Contract Nonr-3656(26)
Unclassified report

Revision of manuscript submitted 28 Jul 65.

Availability: Published in Journal of Geophysical Research v70 n23 p5793-5805. Copies to DDC users only.

Descriptors: (*Space environmental conditions, Magnetic fields), (*Magnetic fields, Space environmental conditions), Planetary atmospheres, Solar wind, Solar disturbances, Magnetic storms, Astrophysics

A quasi-stationary corotating structure in the interplanetary magnetic field has been observed with the Imp 1 satellite during 3 solar rotations. The interplanetary field is directed predominantly away from the sun for 2/7 of a rotation, then toward the sun for 2/7 of a rotation, then away from the sun for 2/7 of a rotation, and finally toward the sun for 1/7 of a rotation. The interplanetary magnetic field magnitude and the solar wind velocity, density, and flux are discussed with regard to this sector structure. As the structure rotates past the earth once every 27 days it influences geomagnetic activity and cosmic-ray density. A recurring stream of protons of a few Mev energy is almost entirely contained within one sector. The solar source of the recurring geomagnetic storm of December 2, 1963, is associated with a ghost unipolar magnetic region in the solar photosphere. (Author)

AD-626 735 Fld. 3/2, 3/3
CFSTI Prices: HC $1.00 MF $0.50
PALMER PHYSICAL LAB PRINCETON UNIV N J
EXPERIMENTAL AND THEORETICAL INVESTIGATION OF GRAVITATION.
Annual summary rept.,
by R. H. Dicke. 31 Dec 65, 9p. Contract Nonr-1858(30) Proj. NR-013-101
Unclassified report

Descriptors: (*Gravity, Astrophysics), (*Astrophysics, Gravity), Galaxies, Interstellar matter, Stars, Black-body radiation, Relativity theory, Cosmic rays, Helium

Research into the theory of gravitation is summarized. Abstracts are given of the following reports: Theory of the formation of galaxies; Helium production in the big bang; Background radiation from young galaxies; Measurements on cosmic blackbody radiation.

AD-626 897 Fld. 3/2
LINCOLN LAB MASS INST OF TECH LEXINGTON
RADIO-ECHO STUDIES OF METEORS AT 68-CENTIMETER WAVELENGTH.
Revised ed.,
by J. V. Evans. 30 Jul 65, 22p.
Unclassified report

Revision of manuscript submitted 9 Jun 65.

Availability: Published in Journal of Geophysical Research v70 n21 p5395-416 1 Nov 1965. Copies to DDC users only.

Descriptors: (*Radio astronomy, Meteors), (*Meteors, Radar tracking), Extraterrestrial topography, Ionization trails, Radar echo areas, Ultrahigh frequency

Radio-echo observations of sporadic meteors at 68 cm are described. Sufficient information was gathered to permit the computation of the velocity, height, duration, and intensity for most of the meteors. The principal conclusions reached are that (a) the meteors recorded at this short wavelength are seen over a height range not sensibly different from that at long wavelengths; (b) the effective scattering lengths of the trails are short (approx. 50 meters); (c) the over-all lengths of the trails average 6 to 7 km; and (d) evidence of fragmentation is found in about 50% of the meteors observed. The visual magnitude of these meteors, estimated from their rate, corresponds to +8. The short effective scattering length is attributed to a rapid initial expansion of the trail diameter. Five nighttime meteor showers were also studied. By continuously directing the antenna beam at right angles to their paths a very high ratio of shower to sporadic meteors could be obtained. The velocities of the five streams have been measured and also their mean over-all trail lengths. The mass laws obtained for the shower meteors indicated many more bright members than in the sporadic background but are believed to be inaccurate owing to the effects of fragmentation raising the echo intensity above that expected for a solid particle. (Author)

AD-626 911 Fld. 3/2
PRINCETON UNIV N J OBSERVATORY
THE MASSES OF ALPHA HERCULIS AND ETA GEMINORUM,
by N. J. Woolf. 3 Jul 63, 3p. Proj. Stratoscope
Unclassified report

Sponsored by ONR, NSF and NASA.

Availability: Published in The Observatory v83 n937 p260-2 Dec 1963. Copies to DDC users only.

Descriptors: (*Stars, Mass transfer), Astrophysics, Celestial mechanics

M giant stars are examined for mass loss.

AD-626 962 Fld. 3/2, 22/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
A STUDY OF METEOR MATTER,
by T. N. Nazarova. 13 Jan 66, 9p. Rept. no. FTD-TT-65-1418
TT 66-60332
Unclassified report

Unedited rough draft trans. of Geofizicheskii Byulleten' (USSR) n14 p89-91 1965.

Descriptors: (*Meteors, Counting methods), (*Space probes, Meteors), Scientific satellites, Impact shock, Piezoelectric transducers, Sounding rockets, USSR

The report discusses research of meteoric substance carried out by direct methods with the aid of equipment mounted on rockets and satellites. The apparatus for the study of the meteoric particles in the various experiments consisted of piezopickups of different designs.

AD-627 064 Fld. 3/2
CFSTI Prices: HC $4.00 MF $0.75
LOCKHEED-CALIFORNIA CO BURBANK
SELENODETIC MEASUREMENTS AND ERROR ANALYSES OF TWO LOCKHEED ANNULAR ECLIPSE EXPEDITIONS TO AFRICA.
Final rept. 1 Jun 64-31 May 65,
by L. G. Stoddard, D. G. Carson, and J. S. Fritzen. Jan 66, 107p. Rept. no. LR-18858
Contract AF19 (628)-4162 Proj. AF-8654 Task 865407
AFCRL 65-532
Unclassified report

Descriptors: (*Solar eclipses, Photography), (*Moon, Solar eclipses), Astrophysics, Lunar environment, Photographic analysis, Photographic equipment, Africa

The methods used to obtain and analyze the results of two annular eclipses in Africa by Lockheed USAF expeditions are described. Comparison is made with University of Manchester results and Watts Atlas of the Marginal Zone of the moon. The 1962 July 31 eclipse agrees well with Watts for local irregularities but does contain a discrepancy. The 1963 January 25 shows good correlation with the same discrepancy. A description of the expeditions and recommendations for future work is also made in this report. (Author)

AD-627 185 Fld. 3/2
CFSTI Prices: HC $1.00 MF $0.50
WARNER AND SWASEY OBSERVATORY CASE INST OF TECH CLEVELAND OHIO
STUDY OF THE DISTRIBUTION OF HIGHLY LUMINOUS STARS IN OUR GALAXY.
Final rept.,
by J. J. Nassau, and C. B. Stephenson. 6 Jan 66, 14p. Contract Nonr-2797 (00)
Unclassified report

Descriptors: (*Galaxies, Optical properties), (*Stars, Galaxies), Astrophysics, Instrumentation, Spectroscopy

The purposes of the investigations have been the following: (a) To conduct a search of the northern Milky Way for intrinsically luminous stars of early spectral type, to fainter apparent magnitudes than hitherto achieved systematically, (b) pursuant to point (a), to check and, if possible, improve existing methods of classifying lowdispersion stellar spectra on objective-prism plates, (c) to test whether any gross features of galactic structure may be determined from the raw material of (a), and (d) to utilize the objective prism plates secured for part (a) for the identification of other spectra of unusual interest falling in the survey area. (Author)

AD-626 780 See Fld. 20/8

AD-626 888 See Fld. 7/4

AD-626 945 See Fld. 12/1

AD-626 979 See Fld. 6/19

3/3. CELESTIAL MECHANICS

AD-626 673 Fld. 3/3
CFSTI Prices: HC $1.00 MF $0.50
NAVAL OBSERVATORY WASHINGTON D C
ANNULAR SOLAR ECLIPSE OF 20 MAY 66,
by Julena S. Duncombe. 6 Aug 65, 24p. Rept. no. Circular-109
Unclassified report

Descriptors: (*Solar eclipses, Astronomical data), Astronomy, Tables, Celestial mechanics

This Circular contains the following information: The Climatological Data for May; The Eclipse Map from the American Ephemeris and Nautical Almanac; The Path of the Annular Phase; The Central Line, Duration and Width of Path at 10,000 feet, 20,000 feet, 30,000 feet, and 40,000 feet; The Central Line, Duration and Width of Path at 100 km, 200 km, and 300 km; Local Circumstances for Points on the Central Line; Local Circumstances for Geographic Locations for both Annular and Partial Phase; Maps of Portions of the Path, and of the Entire Path.

AD-626 735 See Fld. 3/2

AD-627 161 See Fld. 20/14

Field 4-ATMOSPHERIC SCIENCES

4/1. ATMOSPHERIC PHYSICS

AD-626 679 Fld. 4/1, 22/2
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
SATELLITE ENVIRONMENT HANDBOOK -- BOOK REVIEW,
by G. F. Schilling. Jan 66, 3p. Rept. no. P-3292
Unclassified report

Prepared for the Publications of the Astronomical Society of the Pacific, v77 n458 Oct 1965.

Descriptors: (*Space environmental conditions, Handbooks), Reviews, Astrophysics, Geophysics

Book review for the 'Publications of the Astronomical Society of the Pacific.' Eight short chapters present brief analyses and new data summaries on the structures of the upper atmosphere and ionosphere, penetrating particle radiation and solar radiation, micro-meteorites, radio noise, thermal radiation from the earth, and geomagnetism.

AD-626 690 Fld. 4/1
CFSTI Prices: HC $2.00 MF $0.50
MICHIGAN UNIV ANN ARBOR
EFFECTIVE RADIATION TEMPERATURES OF THE OZONOSPHERE OVER NEW MEXICO.
Geophysical research papers,
by Arthur Adel. Dec 49, 37p. Rept. no. GRP-2
Contract W-33-038-ac-14050
Unclassified report

Descriptors: (*Ozone, Atmosphere), (*Atmospheric sounding, Ozone), Radiation (Heat transfer), Diurnal variations, Meteorological parameters, New Mexico

Effective radiation temperatures of the ozonosphere were determined near Alamogordo, New Mexico, for 51 days and 5 nights between 23 March and 15 July 1948. A total of 138 independent sets of daytime data were obtained. Analysis of these data showed that there was no marked diurnal effect. The effective radiation temperature, in the neighborhood of -40C, was essentially the same for both day and night. Observations showed no systematic connection between water vapor content of the atmosphere and effective radiation temperature of the ozonosphere. There was no marked effect of the amount of ozone (or of any other atmospheric constituent) in the radiation path on the obtained temperature values, except for very low altitude of the sun or moon, which resulted in a raising of the values. It was found that the ozonosphere radiation near zenith at 9.57 microns did not change in a pronounced way during the sunrise or sunset periods. (Author)

AD-626 694 Fld. 4/1, 18/3
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

ELECTRON DENSITY PROFILES OF WAVE-MOTIONS IN THE IONOSPHERE CAUSED BY NUCLEAR DETONATIONS.
Research rept.,
by George J. Gaßmann. Apr 63, 26p. Rept. no. AFCRL-63-440
Proj. AF-8653

Unclassified report

Descriptors: (*Ionospheric disturbances, Nuclear explosions), (*Nuclear explosions, Ionospheric disturbances), Atmospheric sounding, Ionosphere, Electron density, Explosion effects

Horizontally traveling waves in the ionosphere, occurring naturally and from nuclear detonations, cause nonvertical reflections and, therefore, abnormal ionospheric recordings at stations during overhead passage. It is shown how an electron density cross-section in the vertical plane through an ionospheric wave can be constructed from a single station's ionospheric recordings, provided those are taken at time intervals not exceeding 5 minutes and provided the general direction of travel is known. The described analysis yields also an approximate value for the velocity. Examples are shown of profiles of ionospheric waves from two different nuclear detonations, observed at great distances. The ionospheric wave of 30 October 1961 from Novaya Zemlya appears to be caused by a gravity wave, as may be inferred from a table which gives a review of world-wide observations. (Author)

AD-626 700 Fld. 4/1, 20/14
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS SPACE PHYSICS LAB
SMALL-SCALE IONOSPHERIC IRREGULARITIES,
by J. Aarons, G. Kantor, J. Klobuchar, W. Kidd, and H. Silverman. Jul 62, 12p. Proj. AF-4643
AFCRL 62-853

Unclassified report

Also includes Scintillations of Radio Stars and Satellites During Intense Magnetic Disturbances. Irregular Lunar Reflection Polarization Changes Noted in the Presence of Aurora.

Availability: Published in Nature v193 n4822 p1246-9 Mar 31 1962 and Journal of Geophysical Research v67 n1 p111-13 Jan 1962. Copies to DDC users only.

Descriptors: (*Ionospheric disturbances, Electron density), (*Atmospheric sounding, Radio waves), Extraterrestrial radio waves, Scintillation, Moon, Electromagnetic wave reflections, Ionosphere, Refractive index

AD-626 725 Fld. 4/1, 4/2
CFSTI Prices: HC $5.00 MF $1.00
CALIFORNIA UNIV LOS ANGELES INST OF GEOPHYSICS AND PLANETARY PHYSICS
METHODS AND RESULTS OF UPPER ATMOSPHERE RESEARCH,
by J. Kaplan, G. F. Schilling, and H. K. Kallmann. Nov 55, 174p. Contract AF19 (604)-111 ,CWB-7904
AFCRL TR-55-224,GRP-43

Unclassified report

Descriptors: (*Upper atmosphere, Atmospheric sounding), (*Atmospheric sounding, State-of-the-art reviews), Probes, Sound transmission, Sounding rockets, Balloons, Noctilucent clouds, Meteors, Sky brightness, Radio transmission, Light transmission, Meteorological parameters

The various means of investigating the physical state of the upper atmosphere of the earth have been classified according to the sources of information, e.g. rocket flights meteor observations, sound propagation, etc. Each method has been described briefly and typical results concerning temperature, pressure, density, composition, and wind systems are given in the text as well as in form of tables and diagrams. Special emphasis has been placed on the distinction between results which come from direct measurements, and results which have been derived by methods where theories and hypotheses are involved without observations to prove the necessary assumptions. Literature references are part of each separate chapter. (Author)

AD-626 726 Fld. 4/1
CFSTI Prices: HC $4.00 MF $1.00
AERONUTRONIC DIV PHILCO CORP NEWPORT BEACH CALIF
ABSORPTION BY H2O BETWEEN 2800 AND 4500 CM-1 (2.7 MICRON REGION).
Scientific rept.,
by Darrell E. Burch, David A. Gryvnak, and Richard R. Patty. 30 Sep 65, 129p. Rept. no. U-3202
Contract Nonr-3560 (00) ,ARPA Order-273

Unclassified report

Descriptors: (*Water vapor, Absorption spectrum), Line spectrum, Pressure, Tables, Solar radiation, Band spectrum, Solar spectrum, Atmosphere

The absorption by water vapor between 2800 and 4500/cm has been investigated. Spectra have been obtained for samples at pressures from 0.48 torr to 10 atm, and with absorber thicknesses varying from .0008 x to 0.7 gm/cm. Transmission spectra are shown along with extensive tables of transmittance, integrated absorptance, and the integrated absorption coefficient. Results are presented for samples chosen to provide information about the strengths, widths, and shapes of many of the absorption lines. The combined strength of the nu sub 1 and nu sub 3 bands has been found to be 28 = 15000 cm/gm; and the strength of the 2 nu sub 2 is 3.5 = 0.7 x 103 cm/gm. (Author)

AD-626 906 Fld. 4/1, 7/4
HIGH ALTITUDE OBSERVATORY BOULDER COLO
AEROSOLS IN THE STRATOSPHERE: A COMPARISON OF TECHNIQUES OF ESTIMATING THEIR CONCENTRATION.
Revised ed.,
by Gordon Newkirk,Jr., and John L. Kroening. 1 Jul 65, 4p. Contract Nonr-393 (05) ,Nonr-710 (22)

Unclassified report

Prepared in cooperation with Minnesota Univ., Minneapolis, School of Physics. Revision of manuscript submitted 7 Nov 64.

Availability: Published in Journal of Atmospheric Sciences v22 n5 p567-70 Sep 1965. Copies to DDC users only.

Descriptors: (*Aerosols, Stratosphere), (*Stratosphere, Aerosols, Probes, Solar radiation, Scattering, Ions, Counting methods

Simultaneous measurements of the stratospheric aerosol by light scattering and small ion interaction are presented. The cross section of the stratospheric aerosol is estimated to vary from 10 to the minus 7th power to 10 to the minus 8th power sq cm/cc. The stratification of the aerosol shows layers of high concentration with vertical dimensions of the order of 30 meters separated by intrusions of clean air with vertical dimensions of the order of 300 meters. (Author)

AD-626 828 **See Fld. 14/2**

AD-626 945 **See Fld. 12/1**

AD-627 052 **See Fld. 20/14**

AD-627 161 **See Fld. 20/14**

4/2. METEOROLOGY

AD-626 678 Fld. 4/2
CFSTI Prices: HC $3.00 MF $0.75
CALIFORNIA UNIV LOS ANGELES DEPT OF METEOROLOGY
THE OBSERVED MEAN FIELD OF MOTION OF THE ATMOSPHERE.
Geophysical research papers,
by Yale Mintz, and Gordon Dean. Aug 52, 63p.
Contract AF19 (122)-48
AFCRL GRP-17

Unclassified report

Descriptors: (*Atmospheric motion, Air mass analysis), (*Air mass analysis, Climatology), Wind, Meteorological charts

What is observationally known about the atmosphere's mean horizontal motion has here been brought together in an empirical and objective manner. Except for limited use of the geostrophic wind law, there is no dependence on hydrodynamical theory: what actually takes place in the atmosphere is described without reference to preconceived ideas as to what should take place. Following meteorolotical convention, the periods chosen for the computation of the means are the months of July and January, taken over many years. Means taken over these discontinuous periods are not strictly equivalent to steady states, but the differences from the steady state are small and easily computed. The July maps are placed before the January ones in order to show the period of weaker circulation in the northern hemisphere before the period of stronger circulation. Practical considerations have limited the upper-air analysis to a single level: the 500-mb surface, which is in the middle of the troposphere with respect to height and in the middle of the whole atmosphere with respect to its mass. (Author)

AD-626 689 Fld. 4/2
CFSTI Prices: HC $4.00 MF $0.75
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
NOTES ON THE THEORY OF LARGE-SCALE DISTURBANCES IN ATMOSPHERIC FLOW WITH APPLICATIONS TO NUMERICAL WEATHER PREDICTION,
by Philip Duncan Thompson. Jul 52, 101p.
AFCRL GRP-16

Unclassified report

Descriptors: (*Atmospheric motion, Weather forecasting), (*Weather forecasting, Atmospheric motion), Hydrodynamics, Equations of motion, Numerical analysis

The problem of predicting the behavior of large-scale disturbances in the mean horizontal flow of the earth's atmosphere, which is directly connected with the problem of predicting the day-to-day changes of surface weather conditions, has been studied from the standpoint of formulating and solving the hydrodynamical equations which govern the flow. Owing to the difficulty of solving the complete system of equations, it is convenient to develop a 'scale theory' whereby the various possible types of atmospheric motion, each corresponding to a distinct type of solution, can be distinguished and classified. As it turns out, each type of motion is characterized by its phase speed and frequency. The large-scale disturbances, for example, are distinguished from all other types of motion by the fact that their characteristic phase speed is much less than that of sound waves and of high-speed internal gravity waves. By explicitly introducing this information into a mean vorticity equation for adiabatic flow, it is then possible to reduce the system to a single equation from which the extraneous solutions have been excluded and which is otherwise free of major difficulties. The resulting 'prognostic equation,' which governs the largescale motions of a fictitious two-dimensional fluid whose velocity is a vertically integrated mean value of the horizontal component of velocity in the real three-dimensional atmosphere, forms the

basis for a method of numerical prediction. An iterative scheme, based on the solutions of a succession of linear equations, has been proposed for solving the nonlinear prognostic equation. (Author)

AD-626 706 Fld. 4/2, 8/3, 6/3, 8/6
CFSTI Prices: HC $1.00 MF $0.50
DIRECTORATE OF SCIENTIFIC INFORMATION SERVICES OTTAWA (ONTARIO)
MAMMOTHS AND A CLIMATIC PARADOX,
by V. P. Pyankov. Dec 65, 14p. Rept. no. t-444-R TT 66-60270
Unclassified report

Trans. of Priroda (USSR) n10 p86-94 1965.

Descriptors: (*Mammals, Ecology), (*Arctic regions, Climatology), (*Climatology, Arctic regions), (*Ocean currents, Arctic regions), Palontology, Arctic Ocean, Gulf Stream, USSR

A semi-popular discussion concerning the reconstructed ecological setting of mamoths in the Arctic, the ancient distribution of warm ocean currents in the arctic with particular reference to the Chesha Strait, a proposed scheme for deflecting the Gulf Stream into the Southern Barents Sea for the purpose of warming certain areas of the Arctic.

AD-626 898 Fld. 4/2
WASHINGTON UNIV SEATTLE DEPT OF ATMOSPHERIC SCIENCES
AN AUTOMATED RADIATION CLIMATOLOGY STATION AT PT. BARROW, ALASKA,
by L. A. Stroschein. 1964, 13p. Contract Nonr-477 (24) Proj. NR-307-252
Unclassified report

Proceedings of the Alaskan Science Conference (15th), College (Alaska), 31 Aug-4 Sep 64.

Availability: Published in Science in Alaska p61-72 15 Mar 65. Copies to DDC users only.

Descriptors: (*Weather stations, Automation), (*Climatology, Alaska), Radiation (Heat transfer), Recording systems, Integrators (Computers), Radiometers

AD-626 900 Fld. 4/2
WASHINGTON UNIV SEATTLE DEPT OF ATMOSPHERIC SCIENCES
THE FORMATION OF DRAINAGE WIND ON A SNOW-DOME.
Revised ed.,
by J. A. Businger, and K. Ramana Rao. 23 Apr 65, 9p. Contract DA-AMC-36-039-63-G1 ,NSF-G19271
Unclassified report

Revision of manuscript submitted 1 Sep 64.

Availability: Published in Journal of Glaciology v5 n42 p833-41 Oct 1965. Copies to DDC users only.

Descriptors: (*Micrometeorology, Snow), (*Snow, Micrometeorology), Heat flux, Heat transfer, Wind, Surface area, Earth (Planet)

Direct measurements of the horizontal divergence of the air flow close to the snow surface have been made. The mean vertical wind component has been derived from these observations. The temperature, profile has been analyzed near the center of the snow-dome and a method to determine the sensible heat flux independent from the energy budget has been developed. (Author)

AD-626 974 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
EXPERIENCE IN COMPUTING THE TURBULENT FLUX OF HEAT AND THE EXPENDITURE OF HEAT ON EVAPORATION,
by N. A. Timofeev. 11 Jan 66, 22p. Rept. no. FTD-TT-65-1814
TT 66-60344
Unclassified report

Unedited rough draft trans. of Dal'nevostochnyi Nauchno-Issledovatel'skii Gidrometeorologicheskii Institut. Trudy (USSR) n15 p167-80 1963.

Descriptors: (*Heat flux, Marine meteorology), (*Heat of vaporization, Marine meteorology), (*Marine meteorology, Pacific Ocean), Atmospheric motion, USSR, Oceanographic vessels, Wind

The article gives an account of a method of conducting gradient observations from a ship in ocean conditions, a method of calculating the turbulent flux of heat and the expenditure of heat on evaporation, and also the results of calculating these values in different latitude zones of the central part of the Pacific Ocean in the autumn-winter period, 1960-61. (Author)

AD-627 090 Fld. 4/2, 8/6
CFSTI Prices: HC $3.00 MF $0.75
WEATHER SQUADRON (30TH) SAN FRANCISCO CALIF 96307
FEBRUARY CLIMATE OF SOUTHEAST ASIA.
Dec 65, 66p.
Unclassified report

Descriptors: (*Southeast Asia, Climatology), (*Climatology, Southeast Asia), Geography, Meteorological parameters, Aeronautics, Oceanology

This study is the second of a series of publications dealing with the climate of Southeast Asia on a monthly basis. For the purpose of this study Southeast Asia is defined as North Vietnam, Republic of Vietnam, Laos, Cambodia and Thailand. The format of this volume has been organized in an effort to provide ready reference material to meet a variety of requirements for different users; however, information contained in this publication is based on climatic averages and should not be construed as a forecast.

AD-627 147 Fld. 4/2
CFSTI Prices: HC $3.00 MF $0.75
METEOROLOGY RESEARCH INC ALTADENA CALIF
ANALYSIS OF FLAGSTAFF DATA.
Quarterly rept. no. 2, 1 Feb-30 Apr 65,
by Paul B. MacCready Jr., Alan I. Weinstein, and Donald M. Takeuchi. 30 Apr 65, 91p. Contract DA-28-043-AMC-00406 (E) Task 1V0-14501-B-53A-06-03
Unclassified report

See also AD-619 978.

Descriptors: (*Clouds, Phase studies), (*Raindrops, Nucleation), (*Storms, Dynamics), Convection (Atmospheric), Water vapor, Atmospheric condensation, Meteorological phenomena, Meteorological parameters, Scientific research, Arizona

This report continues the analysis of data obtained in the summers of 1962 and 1963 on the Flagstaff field program. The total program consists of four subjects: (1) Precipitation mechanisms and droplet coalescence; (2) case studies of seeded clouds; (3) cloud and storm development; and (4) electrification. This report contains the final results of item (1) and a final portion of item (3), each given here as a separate portion with its own abstract. (1) The evolution of droplet distributions with height is given. Droplet concentrations were large, and some correlation of concentration versus upcurrent strength at cloud base was observed. Liquid drops grew in the cells by coalescence, perhaps starting from giant nuclei (ofte about 20 per liter, but zero in one case). Graupel from freezing and riming of these drops was regularly encountered at -5 and -6C, mostly in the cloud outside the convective cores. (3) In southwest flow conditions, morning convective clouds form near the peaks primarily over the sunlit (eastern) slopes. Convective storm formation areas were (a) downwind of the peaks (the convective wake), (b) over the peaks (elevated heat source of the peaks), (c) over a low ridge southwest of Flagstaff (ridge heating), and (d) over the desert northwest of the peaks (isolated desert heat source). (Author)

AD-626 725 See Fld. 4/1

AD-627 243 See Fld. 14/2

Field 5-BEHAVIORAL AND SOCIAL SCIENCES

5/1. ADMINISTRATION AND MANAGEMENT

AD-627 143 Fld. 5/1
CFSTI Prices: HC $2.00 MF $0.50
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
LABOR AND MACHINE LIMITED PRODUCTION SYSTEMS,
by Rosser T. Nelson. Jan 66, 38p. Rept. no. WMSI Working Paper-90
Contract Nonr-233 (73) Proj. NR-047-003
Unclassified report

Descriptors: (*Production control, Mathematical models), Labor, Industrial equipment, Training,, Employment, Design, Experimental design, Control, Queueing theory, Simulation, Programming (Computers), Performance (Engineering)

A number of investigations have been performed with models of machine limited production systems. In the main, the work has centered upon evaluation of alternative queue disciplines. In this paper, a model is proposed for studying systems in which both machines and labor are limiting resources. The proposed model include several design and control factors which offer promising subjects for research. These factors relate to labor and job assignment procedures and control, labor force training, and system flexibility as determined by equipment purchasing and employment policies. Results are reported for an initial set of experiments in which the labor assignment procedure and the size of the labor force are variables. Sugestions are given for further research. (Author)

AD-627 144 Fld. 5/1, 9/2
CFSTI Prices: HC $1.00 MF $0.50
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
SIMULATION FOR CONTROL,
by James L. McKenney. Dec 65, 16p. Rept. no. WMSI Working Paper-91
Contract Nonr-233 (75) Proj. NR-047-041
Unclassified report

Descriptors: (*Management control systems, Simulation), (*Model theory, Management control systems), Decision making, Computers, Operations research, Man-machine systems

The paper is a description of a research project which considers the problems of how a manager can use a simulation model to control a transformation process. The approach is to observe a manager as he participates in the development and use of a simulation model to control the operation of a computation center. How the model is used and the important characteristics of the model are being defined into four attribute classes. This classification is to codify the man-model decision process and to generate hypotheses for further research. (Author)

5/2. DOCUMENTATION AND INFORMATION TECHNOLOGY

AD-626 819 **See Fld. 9/2**

AD-626 820 **See Fld. 9/2**

AD-626 923 **See Fld. 1/3**

5/3. ECONOMICS

AD-626 677 Fld. 5/3, 5/9
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
INVESTMENT IN HUMANS, TECHNOLOGICAL DIFFUSION AND ECONOMIC GROWTH,
by Richard R. Nelson, and Edmund S. Phelps.
Dec 65, 15p. Rept. no. P-3295
Unclassified report

Prepared in cooperation with Yale Univ., New Haven, Conn. Presented at the Meetings of the American Economic Association, New York, N. Y., Dec 65.

Descriptors: (*Economics, Education), (*Education, Industrial production), Labor, Performance (Humans), Management engineering, Agriculture, Mathematical models

The paper is concerned with the relationships between capital structure and technological progress. The process of education is viewed as an act of investment in people, and educated people are seen as bearers of human capital. According to the models presented, the rate of return to education is greater the more technologically progressive is the economy. This suggests that the progressiveness of the technology has implications for the optimal capital structure in the broad sense. It is concluded that society should build more human capital relative to tangible capital the more dynamic is the technology.

AD-626 714 Fld. 5/3, 8/6
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE ARMY WASHINGTON D C
OMSK, THE CENTER OF THE PROGRESSIVE SIBERIAN PETROCHEMICAL INDUSTRY,
by G. P. Belozerov. 6 Jan 66, 3p. Rept. no. i-5872B
TT 66-60277
Unclassified report

Omsk, Tsentr Peredovoi Sibirskoi Neftekhimii, trans. of Geografiya v Shkole (USSR) n2 p16-8 1964.

Descriptors: (*Chemical industry, Siberia), (*Petroleum industry, Siberia), (*Urban areas, USSR), Economics, Industrial plants, Industrial production

AD-626 715 Fld. 5/3, 8/6
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE ARMY WASHINGTON D C
THE DONBASS, A REGION OF MAJOR CHEMISTRY,
by M. V. Lapko. 6 Jan 66, 6p. Rept. no. i-5872C
TT 66-60278
Unclassified report

Donbass, Krai Bolshoi Khimii, trans. of Geografiya v Shkole (USSR) n2 p18-23 1964.

Descriptors: (*Chemical industry, USSR), Industrial production, Economics, Industrial plants, Fertilizers, Communism, Government (Foreign), Urban areas

AD-626 930 Fld. 5/3
CFSTI Prices: HC $3.00 MF $0.75
RAND CORP SANTA MONICA CALIF
ECONOMICS DEPARTMENT PUBLICATIONS, 1960-1965: AN AUTHOR INDEX OF THE OPEN LITERATURE, WITH ABSTRACTS,
by Harriett Porch. Jan 66, 100p. Rept. no. RM-2800-1-Suppl.
Unclassified report

Descriptors: (*Economics, Indexes), (*Bibliographies, Economics), Abstracts

This is an author index for RAND Economics Department publications issued between January 1, 1960 and December 31, 1965, and available in the open literature. Titles and abstracts for publications from 1948 through 1962 may be found in RM-2800-1 (AD-287 175). The present index has as its basic reference list complete bibliographical entries with abstracts, arranged under authors' names. The authors' names are given alphabetically by surname, and the publications of each author are given under his name in a single chronological list (not in separate lists for each publication series). For publications with more than one author, full entries are given for the first-named author, and cross-references are given under the names of co-authors. As a reference aid, the names of all authors are given alphabetically in the Author List immediately preceding the Author Index.

AD-627 201 Fld. 5/3, 5/9
CFSTI Prices: HC $3.00 MF $0.75
RAND CORP SANTA MONICA CALIF
FEMALE LABOR FORCE PARTICIPATION AND ECONOMIC DEVELOPMENT,
by S. Haber. 1 Oct 58, 84p. Rept. no. P-1504
Unclassified report

Descriptors: (*Females, Labor), (*Labor, United States), (*Economy, United States), Humans, History, Aging (Physiology), Males, Employment, Sex, Industries, Employee relations, Manpower studies

The study focuses on the relationship between economic development and trends in female labor force participation. The discussion is confined to the United States. The study is divided into four parts. With economic development, longevity has increased - more so for females than for males. As a result, the share of females and elderly persons in the working-age population has increased. For the periods 1900-1930 and 1930-1950, the relation between changes in the sex-age composition of the working-age population and the rise in the share of females in the labor force is investigated. In section II, factors that may influence the supply of female labor services at a moment of time and over time are surveyed. The variables include (1) the decline in the birth rate and in average family size, (2) the spread of education, (3) urbanization, (4) the reduction in the length of the work week, (5) changes in the legal, political, and social statue of women, (6) the growth in real income, and (7) the reduction in housework. In section III factors influencing the demand for female labor services are examined. The analysis is based on the relation between the job characteristics of various occupations and the characteristics of women as active workers. in section IV a procedure is adopted for testing the relation between the growth of the distribution and service industries and the rise in the share of females in the labor force.

AD-626 716 **See Fld. 8/6**

AD-626 728 **See Fld. 12/2**

AD-627 202 **See Fld. 15/5**

5/4. HISTORY, LAW AND POLITICAL SCIENCE

AD-626 921 Fld. 5/4
CFSTI Prices: HC $3.00 MF $0.50
RAND CORP SANTA MONICA CALIF
THE EVOLVING NATURE OF THE WARSAW PACT,
by Thomas W. Wolfe. Dec 65, 53p. Rept. no. RM-4835-PR
Contract AF49 (638)-1700
Unclassified report

Descriptors: (*USSR, Foreign policy), (*Eastern Europe, Foreign policy), Armed Forces (Foreign), Military strategy, Early warning systems, Defense systems, Propaganda, History, Armed forces maneuvers

An examination of the changes that have taken place in the Warsaw Pact alliance since 1960. The author finds that the first years of the alliance merely institutionalized existing arrangements in East Europe (i.e., the six East Europe countries as a Soviet defensive zone against the West). This function remains; since 1961, however, the Soviets have also expected the six countries to contribute armed forces to military operations. This has meant a more thorough integration of East European forces into Soviet operational plans. The apparent result is a twoway pull: (1) toward increasing interdependence; and (2) toward asserting separate national interests, and, on the part of East Europe, insisting on a greater role in the decision-making process. The political reasons for the changes in the alliance, and their implication for future Soviet policy, are discussed in detail. An annotated bibliography on the history of the Warsaw Pact is provided. (Author)

AD-627 205 Fld. 5/4, 5/11
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
RUSSIA'S NEW MIDDLE CLASS,
by Alf Edeen. 16 Jul 58, 19p. Rept. no. T-91
TT 66-60386
Unclassified report

Trans. of mono. Rysslands Nya Medelklass, Stockholm, 1954.

Descriptors: (*Political science, USSR), (*Communism, USSR), (*Sociology, USSR), Females, Humans, Education

An analysis is given of the social class composition of various Communist Party congresses, and some of the ways that the Soviet Union favors its new middle class are described. For instance, the progressive principle in income taxation stops at 1000 rubles per month, checking accounts earn interest at 3 per cent, and inheritance taxes are very light. The chapter headings are: The party cadres; party elite; nationality question; role of women in the party; and position of the intelligentsia in Soviet society.

AD-627 206 Fld. 5/4, 15/3
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
THE VIOLATION OF ARMS-CONTROL AGREEMENTS: DETERRENCE VS. DETECTION,
by Fred Charles Ikle. 1 Aug 60, 32p. Rept. no. RM-2609-ARPA
Contract AF49 (638)-710 ,ARPA Order-91-59
Unclassified report

Descriptors: (*Arms control, International law), (*Deterrence, Arms control), Evasion, Military strategy, Political science

The principle is declared that study is needed not only into what a violator of an arms-control agreement may do to avoid detection, but also what he may do to escape his penalty. History shows that world opinion is an ineffective sanction for deterring the violation of agreements. An effective sanction depends, above all, on governmental decisions by the injured countries, but a democratic government has to overcome a number of obstacles before it can decide to react effectively to an evasion. One of the most effective deterrents to violation is the threat of a general increase in the military effort of the injured country. It is not enough merely to restore the situation that would exist had it

not been for the arms-control agreement. A number of measures for deterring evasions ought to be pursued to make it more likely that sanctions will be applied and to make sanctions seem more threatening. Political measures would be helpful to make sanctions seem more certain. They would include such things as enabling legislation to facilitate executive action, parliamentary arrangements to publicize evasions, and interallied contingency plans for dealing with a violation if it occurs. To make sanctions seem more effective, technical and military preparations are needed so that a violator cannot obtain a technological or strategic lead.

AD-627 207 **See Fld. 22/1**

5/5. HUMAN FACTORS ENGINEERING

AD-627 219 **See Fld. 5/9**

AD-627 220 **See Fld. 5/9**

AD-627 239 **See Fld. 5/8**

5/6. HUMANITIES

AD-626 731 **See Fld. 9/2**

AD-627 181 **See Fld. 20/1**

5/7. LINGUISTICS

AD-626 843 Fld. 5/7
CFSTI Prices: HC $1.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
COMPRESSION OF ENGLISH TEXT BY INEXACT TRANSMISSION.
Interim technical rept.,
by Beulah Rudner. Aug 65, 23p. Rept. no. PIB-MRI-1279-65
Contract DA-31-124-ARO (D)-380 Proj. DA-20014501B14C
AROD 5978:1

Unclassified report

Descriptors: (*English language, Speech compression), (*Speech compression, English language), Entropy, Frequency, Coding

The subject treated is defined as transmission in which the sense but not the exact symbols of the input message are recoverable. Experimental results in compression by means of minimum redundancy coding are noted, and possible advantages of inexact transmission are discussed. Two forms of inexact transmission were considered in particular: Basic English, and Reduced English. Some statistics on these 2 forms were collected and their word entropies were estimated. (Author)

AD-626 956 Fld. 5/7, 9/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
REALIZATION OF MACHINE ALGORITHM FOR THE DETECTION IN TEXT OF OBJECT NAMES,
by G. S. Tabidze. 3 Jan 66, 18p. Rept. no. FTD-TT-65-1083
TT 66-60326

Unclassified report

Unedited rough draft trans. of Nauchno Tekhnicheskaya Informatsiia (USSR) n8 p47-50 1964.

Descriptors: (*Computational linguistics, Algorithms), Tables, USSR

The problem of detecting and separating names of objects in text consists of finding in text (by phrase testing) names of objects, described by the given text, and in the obtainment of a list of these names. Objects in text may be indicated: (a) by natural names; (b) by changes in positions; (v) predicates acquiring the name value in given context. The problem is solved in two stages: (1) separation of object names (a) and (b) by comparing each word of the processed assumption with words from a special listing, stored in OZU ZTSVM, (2) with the aid of a recognizing assumption form and special criterion separating names of objects of b type. The program for solving this problem was realized on an URAL-4 machine. Objects can be indicated in text by the following types of names: (a) natural names, (b) local names, (c) predicates, acquiring name values in given context. If the list has the name of type v, and further for a corresponding object was detected a new name of type (a), then the name of type (v) is crossed out from the list and in text to word form, corresponding to the name of type (a), is put down a marker.

AD-626 659 **See Fld. 17/2**

AD-626 712 **See Fld. 8/6**

AD-626 819 **See Fld. 9/2**

AD-626 820 **See Fld. 9/2**

AD-627 152 **See Fld. 6/5**

5/8. MAN-MACHINE RELATIONS

AD-627 239 Fld. 5/8, 5/5, 9/5
CFSTI Prices: HC $2.00 MF $0.50
ELECTRONIC SYSTEMS DIV L G HANSCOM FIELD MASS DECISION SCIENCES LAB
HUMAN DIFFERENTIAL SENSITIVITY TO VIBROTACTILE STIMULATION USING A PASSIVE ENVIRONMENTAL SENSOR,
by John Coules, and Donald L. Avery. Nov 65, 31p. Proj. AF-7682 Task 768201
ESD TR-65-576

Unclassified report

Descriptors: (*Sensory perception, Vibration), (*Vibration, Sensory perception), Touch, Sensitivity, Thresholds (Physiology), Perception, Photoconductivity, Photoelectric materials, Transducers, Oscillators, Brightness, Frequency, Environment, Decision making, Performance (Human), Human engineering

A passive environmental sensor was evaluated as an input device capable of presenting tactile data to a human. The experiment provided information on the ability of the human to detect differences within the range of the vibratory transducer. Frequency discrimination thresholds showed wide differences between subjects and a significant increase in human sensitivity at one point of the frequency input levels. This increases sensitivity was explained in terms of the resonant frequency of the vibratory and also in terms of the generally known high human sensitivity for amplitude and frequency changes at 200-300 cps. It was concluded that for fine-grain data discrimination individual differences may influence the final design of the sensor. However, these differences may be reduced and the sensitivity of the user improved if its electronic design and its transducers provide redundancy to the human. (Author)

5/9. PERSONNEL SELECTION, TRAINING AND EVALUATION

AD-626 815 Fld. 5/9
CFSTI Prices: HC $1.00 MF $0.50
NAVAL PERSONNEL RESEARCH ACTIVITY WASHINGTON D C
PROMOTION PERCENTAGE RATES BY PNEC, AND PROGRAMS COMPARED WITH NAVY WIDE PERCENTAGE RATES BY RATING.
Personnel research note,
by John Wells, and William Conway. Nov 64, 9p.
ND 65-17 (N)

Unclassified report

Descriptors: (*Naval personnel, Personnel management), Submarine personnel, Naval training, Standards, Selection, Data

The primary purpose of the research was to determine if there is any significant difference between overall Navy rating promotion rates and promotion rates of specially trained personnel identified by Primary Navy Enlisted Codes (PNEC'S) or within BUPERS Personnel Management Programs identified by a group of NEC's. It was found that there is a significant difference between overall Navy rating promotion rates and promotion rates of specially trained personnel identified by PNEC's. The promotion rates by Program PNEC are appreciably greater and warrant consideration when applying a promotion factor to a projected inventory in CAPRI.

AD-626 816 Fld. 5/9
CFSTI Prices: HC $1.00 MF $0.50
NAVAL PERSONNEL RESEARCH ACTIVITY WASHINGTON D C
SSB (N) WEAPONS SYSTEM PERSONNEL STATISTICS.
Personnel research note,
by L. M. White. Mar 65, 6p.
ND 65-34 (N)

Unclassified report

Descriptors: (*Naval training, Weapon systems), (*Naval personnel, Selection), Tables, Statistical data

AD-626 817 Fld. 5/9
CFSTI Prices: HC $1.00 MF $0.50
NAVAL PERSONNEL RESEARCH ACTIVITY WASHINGTON D C
POLARIS UNIVERSITY EXTENSION PROGRAM.
Progress rept. on Polaris Personnel Research,
by William B. Cooper. Apr 65, 21p.
ND 65-42

Unclassified report

Descriptors: (*Submarine personnel Education), Universities, Submarines, Instructors

The report reviews the current status of the Polaris University Extension Program; evaluates its progress; appraises its value to the Polaris Submarine Force; and is intended to publicize this educational program within the Navy Department. The study was requested by the Special Projects Office with the specification that it be an informational type report rather than a statistical analysis. (Author)

AD-626 841 Fld. 5/9
CFSTI Prices: HC $1.00 MF $0.50
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
VALIDATION OF OCS SELECTION INSTRUMENTS: THE RELATIONSHIP OF OCS SELECTION MEASURES TO OCS PERFORMANCE.
Technical bulletin,
by Bob D. Rhea. Jan 66, 19p. Rept. no. STB-66-18
Proj. PF016050402

Unclassified report

Descriptors: (*Officer personnel, Selection), Performance (Human), Naval personnel, Naval training, Aptitude tests, Correlation techniques, Statistical analysis

The purpose of this project was to investigate the relationship of several OCS selection variables, both operational and experimental to OCS performance. The subjects were 1,951 graduates from six OCS classes selected in 1957 and 1958. The criteria of school performance were the grades received by the officer candidates during OCS training. It was concluded that: (1) the best operational selection variables are: the Officer Qualification Test, the first two Quality items on the Officer Inquiry Form (the ability to make logical decisions and the ability to originate and act upon ideas of

his own), and the Average College Grade (validities with Final Grade were .50, .26, and .22, respectively); (2) there is little reason to recommend changing the operational Inquiry Form (Form 1751) at this time, since the experimental Inquiry Forms (average validity .20) did not prove to be more valid than some of the Quality Scores on the operational form; (3) in analyzing combinations of predictor variables it was found that no two variable combination yielded a useful increase in validity. (Author)

AD-627 011 Fld. 5/9, 5/10
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA
THE RELATIONSHIP OF THE EDWARDS PERSONAL PREFERENCE SCHEDULE TO SUCCESS IN NAVAL FLIGHT TRAINING,
by Floyd E. Peterson, Norman E. Lane, and Robert S. Kennedy. 8 Oct 65, 14p. Rept. no. NAMI-946
NAVMED MF022.01-5001.1-46
Unclassified report

Descriptors: (*Aviation personnel, Selection), (*Psychometrics, Aviation personnel), (*Personality, Psychometrics), Naval training, Performance (Human)

The Edwards Personal Preference Schedule, a forcedchoice personality 'need' inventory, was evaluated as a predictor of success or failure in naval flight training. The EPPS failed to discriminate between student aviators who completed training successfully and those who dropped voluntarily or failed due to poor performance. (Author)

AD-627 076 Fld. 5/9
CFSTI Prices: HC $2.00 MF $0.50
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
REPLAB, A STUDY IN SCIENTIFIC INQUIRY USING THE PLATO SYSTEM,
by Donald L. Bitzer, Elisabeth R. Lyman, and J. Richard Suchman. Dec 65, 36p. Rept. no. R-260
Contract DA-28-043-AMC-00073 (E), Nonr-3985 (08) Proj. DA-20014501B31F
Unclassified report

See also AD-623 526.

Descriptors: (*Programmed instruction, Learning), (*Teaching machines, Digital computers), Education, Students, Man-machine systems, Performance (Human), Experimental design, Decision making

One of the teaching techniques employed in the Illinois Studies in Inquiry Training project was a lesson, REPLAB, (Responsive Environment Programmed Laboratory), written for use with the PLATO computer-controlled teaching system. The lesson was designed to develop inquiry skills and to study inquiry styles of individual students. A film, showing an event involving a bimetallic strip was presented to the students by means of a computer-activated projector. The students answered questions about the event posed them via the PLATO 'electronic book.' Answers to some of the questions could be found by careful observation of the film, others by obtaining further information from results displayed on their 'electronic blackboards' by the computer in response to their inquiries in the PLATO experiment laboratory, property laboratory or condition laboratory. One set of questions in the question sequence tested the students' ability to go beyond the data they had obtained from the computer and formulate theories. The detailed record of the REPLAB student responses provided by the PLATO system gave data for a correlation of variables in the REPLAB lesson with those from pre-tests and post-tests given the students. (Author)

AD-627 162 Fld. 5/9, 1/2
CFSTI Prices: HC $2.00 MF $0.50
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
COMPARISON OF CONVENTIONAL AND PROGRAMED INSTRUCTION IN TEACHING AVIONICS FUNDAMENTALS.
Technical bulletin,
by Alexander A. Longo, and G. Douglas Mayo. Dec 65, 32p. Rept. no. STB-66-16
Proj. PF017030401
Unclassified report

Descriptors: (*Education, Analysis), (*Aeronautics, Naval training), (*Naval training, Programmed instruction), (*Programmed instruction, Effectiveness), Electronic equipment, Electrical equipment, Psychometrics, Direct current, Circuits, Meters, Naval personnel

The study is one of a series of investigations involving a variety of course content and training conditions where programed instruction will be compared with conventional classroom instruction to provide information about the general utility of programed instruction. Here the performance of 200 trainees taking 26 hours of conventional instruction in electrical calculations, direct current circuits, and direct current meters is compared with the performance of 200 trainees taking 19 hours of programed instruction on the same content. Results indicate: (1) The basic electronics students learned a relatively large block of programed material to about the same degree but in substantially less time than was required by conventional instruction; (2) the constructed response examination, prepared for programed instruction purposes, exhibited satisfactory reliability; (3) the conventional and programed instruction groups did not differ significantly with respect to variability in performance; (4) the '09/90 performance level' of programed material decreased as a function of the amount of programed material tested at a given time. (Author)

AD-627 175 Fld. 5/9
CFSTI PricesMF $1.50
ARMS CONTROL AND DISARMAMENT AGENCY WASHINGTON D C
A CASE STUDY OF THE EFFECTS OF THE DYNASOAR CONTRACT CANCELLATION UPON EMPLOYEES OF THE BOEING COMPANY IN SEATTLE, WASHINGTON.
by Leo Neuschwander, and Ray Williams. Jul 65, 311p.
Unclassified report

Availability: Superintendent of Documents, GPO, Wash., D. C., 20402 HC$1.50, CFSTI MF$1.50.

Descriptors: (*Employment, Astronautics), (*Personnel management, Astronautics), Wages, Boost-glide vehicles, Personnel, Statistical analysis, Aircraft industry

The objectives of the study were: (1) to determine the characteristics of affected workers; (2) to determine their post-layoff work experience; (3) to identify the major obstacles they encountered in finding another job; and (4) to evaluate the assistance workers received in seeking work.

AD-627 179 Fld. 5/9, 5/10
CFSTI Prices: HC $1.00 MF $0.50
NEW HAMPSHIRE UNIV DURHAM
ROLECENTRISM AND EXPERIENCE IN AN OCCUPATION.
Technical rept.,
by Brian R. Kay, Margaret Riggs, and Charles A. Lowe. Dec 65, 21p. Rept. no. TR-2
Contract Nonr-3710 (03) Proj. NR-170-315
Unclassified report

Prepared in cooperation with New Hampshire Child Guidance Clinics.

Descriptors: (*Instructors, Behavior), Aging (Physiology), Education, Perception (Psychology), Attitudes, Motivation, Teaching methods, Students, Children, Statistical analysis

The paper examines the apparent influence of age, academic degree, and years of experience on differences among elementary school teachers in their perception of the 'acting out' or disruptive child in their classrooms. Years of experience appears to be the primary factor and is held to be consistent with the theoretical model for rolecentric behavior. (Author)

AD-627 213 Fld. 5/9
CFSTI Prices: HC $1.00 MF $0.50
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
THE VALUES OF JUNIOR OFFICERS, PART I: IMPORTANCE, OBTAINABILITY AND COMPARABILITY OF VARIOUS CAREER VALUES.
Research rept.,
by William H. Githens. Jan 66, 21p. Rept. no. SRR-66-11
Proj. PF016070201
Unclassified report

Descriptors: (*Officer personnel, Navy), (*Naval personnel, Job analysis), Personnel management, Motivation, Sampling, Tables

Junior officers commissioned via the NROTC Regular program responded to a questionnaire designed to measure: (1) the importance of various aspects of a career, (2) the obtainability of these aspects by a naval career, and (3) the degree to which in each aspect the Navy career has the advantage over most likely held civilian jobs. Junior officers as a group were described in term of these three measurements. One of the conclusions pointed out that the following aspects were considered important but not readily obtainable in the Navy: satisfactory home life; full use of abilities; work under consistent and intelligent personnel policies; feelings of accomplishment; and success through ability alone. (Author)

AD-627 218 Fld. 5/9
CFSTI Prices: HC $2.00 MF $0.50
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA
THE EFFECTIVENESS OF THE NAVAL AIR BASIC INSTRUMENT TRAINER,
by Richard S. Pomarolli. 5 Nov 65, 47p. Rept. no. SR-65-7
Unclassified report

Descriptors: (*Flight simulators, Effectiveness), *Instrument flight, Training devices), (*Training devices, Effectiveness), Naval training, Transfer of training, Students, Instructors

The study evaluated the effectiveness of the Naval Basic Instrument Trainer (NavBIT) as it is currently used in the Basic and Radio Instrument Navigation Stages of Basic flight training. Findings are based on a detailed study of individual student reactions and on an intensive search of the pertinent literature. The study indicates that the Naval Basic Instrument Trainer is doing an effective job as an aid to teaching instrument flight, and that the expenditure for a more elaborate simulator would not be justified in terms of increased effectiveness. It also points out that the students themselves feel that the link trainer is adequately fulfilling its basic purpose of teaching procedures, scan, and the reading of instruments. (Author)

AD-627 219 Fld. 5/9, 19/6, 5/5
CFSTI Prices: HC $1.00 MF $0.50
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
MOONLIGHT XI. AN INVESTIGATION OF INDIVIDUAL NIGHT RIFLE FIRING UNDER ILLUMINATION RANGING FROM NO MOON THROUGH FULL MOON.
Staff memo.,
by John Sivy, and John E. Taylor. Aug 56, 16p.
Unclassified report

Report on One Phase of Task Moonlight. Experimental Development of Improved Methodology for Training the Infantry Soldier in Night Fighting.

Descriptors: (*Army training, Night warfare), (*Firing tests (Ordnance), Rifles), Army personnel, Performance (Human), Illumination, Moon

The objective of the research was to examine the data collected during the implementation of Training Circular 23-1 by the Weapons Department of The Infantry School, Fort Benning, Georgia, to determine the applicability of the prescribed individual night rifle firing procedure under low levels of illumination ranging from no moon through full moon. Conclusions: A general confirmation of the individual night firing procedures prescribed by TC 23-1 is indicated. An interaction was observed between firing technique (pointing or aiming) and low levels of natural illumination. At some point between half and full moon the pointing technique becomes less effective than the aiming technique. It is recommended that HRU Nr 3 coordinate with TIS to gather additional individual night firing data at low levels of natural illumination above half-moon in order to accomplish the following objectives: (a) Determine the level of illumination at which the aiming technique becomes more effective than the pointing technique. (b) Establish a criterion or rule of thumb whereby rifle men can determine which method to employ depending upon the level of illumination present. (Author)

AD-627 220 Fld. 5/9, 19/6, 5/5
CFSTI Prices: HC $4.00 MF $1.00
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
EXPERIMENTAL TRAINING IN NIGHT TECHNIQUE OF FIRE AND SQUAD TACTICS.
Research memo.
Nov 59, 133p.
Unclassified report

Descriptors: (*Army training, Night warfare), (*Firing tests (Ordnance), Rifles), Simulators, Rounds counters, Timing devices, Floodlights, Control panels, Targets, Army personnel, Performance (Human)

An experimental program of instruction for an integrated day-night program of basic training in squad technique of fire is examined. The program presents a modification of the TOE squad firing problem for the presentation of night training in technique of rifle fire and squad tactics to basic trainees. The instruction was administered to basic trainees in 1956 and revised to include suggested modifications. The revised training was administered to another group of basic trainees in 1957. As the Subtask was not completed, no final evaluation of the effectiveness of the experimental training was made. Until an appropriate test is developed to evaluate the training, no conclusions or recommendations concerning the training value can be justified. However, the revised lesson plans and operational details of the 1957 administration are included as part of the final report and may be useful to those responsible for night training or those conducting research on a similar night training course. (Author)

AD-627 227 Fld. 5/9, 15/7
CFSTI Prices: HC $3.00 MF $0.75
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
SPRING 1956 RESEARCH ON RECONNAISSANCE PATROLLING: A BASIC COURSE IN INDIVIDUAL SKILLS.
Staff memo. on Sub-Task PATROL I,
by Joseph F. Follettie, John E. Taylor, and Henry S. Rosenquist. Apr 57, 87p.
Unclassified report

Descriptors: (*Army operations, Military training), (*Army training, Combat serveillance), Army personnel, Navigation, Map reading, Warfare, Night warfare, Auditory acuity, Military tactics

The document reports the development and evaluation of a prototypic basic course of instruction for the individual soldier in those individual skills which are prerequisite to more advanced training in reconnaissance patrolling. In a series of experiments, the effects of instruction upon subsequent night proficiency in land navigation and information collection by remote observation were studied under controlled conditions. Information collection by close observation, and individual day and night movement instruction were administered, but objective data relating to these elements of training were not collected. Four experiments, one in land navigation and three in remote observation, were conducted. Method and findings are summarized for each experiment, and activity relating to nonexperimentally evaluated elements of training is covered briefly.

AD-627 228 Fld. 5/9, 15/7
CFSTI Prices: HC $3.00 MF $0.75
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
FALL 1956 RESEARCH ON 'RECONNAISSANCE PATROLLING: A BASIC COURSE IN INDIVIDUAL SKILLS'.
Staff memo. on Sub-Task PATROL I,
by Joseph F. Follettie, Henry S. Rosenquist, and John E. Taylor. May 57, 99p.
Unclassified report

Descriptors: (*Army operations, Military training), (*Army training, Combat surveillance), Army personnel, Navigation, Map reading, Night warfare, Warfare, Auditory acuity, Military tactics

The document reports research relating to (1) revision of a prototypic basic course of instruction for the individual soldier in those individual skills which are prerequisite to more advanced training in reconnaissance patrolling, and (2) completion of evaluation of elements of this instruction. In a series of experiments in information collection by close and remote observation and in land navigation, the effects of instruction upon night field applicatory proficiency were studies under controlled conditions. All elements of the course of instruction were administered, but objective data were collected only on information collection and land navigation elements. Method and findings are summarized.

AD-626 677 **See Fld. 5/3**

AD-627 044 **See Fld. 6/19**

AD-627 201 **See Fld. 5/3**

AD-627 217 **See Fld. 17/8**

AD-627 258 **See Fld. 5/10**

5/10. PSYCHOLOGY (INDIVIDUAL AND GROUP BEHAVIOR)

AD-626 664 Fld. 5/10
CALIFORNIA UNIV LOS ANGELES DEPT OF PSYCHOLOGY
THE EFFECTS OF PARTNER'S BEHAVIOR AND CULTURE UPON STRATEGY IN A TWO-PERSON GAME.
Technical rept.,
by Bertram H. Raven, and Walda F. Leff. 1964, 21p. Rept. no. TR-16
Contract Nonr-233 (54) Proj. NR-171-350
Unclassified report

Availability: Published in Scripta Hierosolymitana v14 p148-65 1965. Copies to DDC users only.

Descriptors: (*Behavior, Social psychology), (*Culture, Social psychology), Game theory, Bargaining, Reaction (Psychology), Personality, Motivation, Group dynamics, Analysis of variance, Israel

A two-person non-zero-sum game which indicates degree of cooperativeness was administered to 114 secondary school students from Israeli kibbutzim (collective communities). Half of these came from a movement which placed a great emphasis on collective ideology; half represented a movement with a more moderate emphasis on collective ideology. One-third of these subjects were faced with a partner who played a consistently non-cooperative game, and one-third had a partner who played an unconditionally cooperative game. The game, with only the first two types of partners, was also presented to 24 American youth who were preparing to spend several months living in Israeli kibbutzim. As found in an earlier study by Solomon (1960), partner's strategy significantly affected behavior - greatest non-cooperative behavior occurred in response to a consistently non-cooperative partner. However, contrary to the Solomon study, Ss with an unconditionally cooperative partner did not behave like those with an unconditionally competitive partner. Also, contrary to expectations, difference in kibbutz ideology did not significantly affect cooperation in the game. Kibbutz youth tended to follow an essentially competitive strategy, in varying degrees, in response to each type of partner, suggesting that they tended to see this as a game where they might show their superiority over their partner rather than try for the best absolute score. (Author)

AD-626 699 Fld. 5/10, 6/4
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
PERCEPTION OF PITCH, TIMBRE, AND LOUDNESS.
Research note,
by Robert A. Jenkins. 20 Jul 61, 10p. Rept. no. AFCRL-62-472
Proj. AF-5632
Unclassified report

Availability: Published in The Journal of the Acoustical Society of America v33 n11 p1550-7 Nov 1961. Copies to DDC users only.

Descriptors: (*Bionics, Psychoacoustics), (*Psychoacoustics, Pitch discrimination), (*Pitch discrimination, Psychoacoustics), Auditory perception, Band-pass filters, Wave functions, Wave analyzers, Speech

A model of psychoacoustic perception is evolved.

AD-626 707 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
CALIFORNIA UNIV LOS ANGELES DEPT OF PSYCHOLOGY
ATTRACTION TO DISLIKED ACTIVITY AS A FUNCTION OF PRIOR ATTACK.
Technical rept.,
by Gerald S. Leventhal, and John Emrick. 30 Sep 65, 17p. Rept. no. TR-17
Contract Nonr-233 (54) Proj. NR-171-350
Unclassified report

Prepared in cooperation with North Carolina State Univ., Raleigh.

Descriptors: (*Behavior, Social psychology), Reaction (Psychology), Attitudes, Motivation, Correlation techniques, Analysis of variance

Seventy-seven male undergraduate subjects met individually with the experimenter who gave them each two tasks to do--a reverse writing task, which was meant to be relatively innocuous, and a taste adaptation task, meant to be unpleasant in that it involved tasting a number of ill-tasting liquids. Data are reported for all but thirteen subjects who did not see the taste task as more unpleasant. Following this, half the subjects were severely criti-

cized for being stupid and not following instructions; half were not criticized, but merely told to continue. The subjects were then to allot the remaining 30 minutes to either the taste task or the innocuous writing task, spending any proportion they wished on one and the rest on the other. It was expected that the criticized subjects would spend relatively more time on the unpleasant task in an effort to arouse guilt in the experimenter. The hypothesis was not supported, there being no significant difference in time spent on each task. Criticized subjects did indicate greater anger toward the experimenter. Thus it appeared that there was not support for the initial prediction. It is suggested that failure to find significant results might have occurred because it was not clear that the experimenter was aware of the relative unpleasantness of the tasks, and might not attribute to himself responsibility for the subject's discomfort. Other analyses indicated that the greater the preponderance of male siblings over female siblings, the more like criticized subjects would deny that they were mistreated, that is, the less they were likely to be upset by personal criticism. (Author)

AD-626 751 Fld. 5/10
CFSTI Prices: HC $2.00 MF $0.50
VANDERBILT UNIV NASHVILLE TENN
THE PICTURE DESCRIPTION TEST: RELIABILITY AND VALIDITY OF A HOMOGENEOUS SCALE.
Technical rept.,
by Carroll E. Izard, Eugene S. Cherry, Arch Arnold, and Jean Fox. Jul 65, 27p. Rept. no. TR-23
Contract Nonr-2149 (03)

Unclassified report

Descriptors: (*Adjustment (Psychology), Psychometrics), (*Psychometrics, Adjustment (Psychology)), Personality, Projective techniques, Reaction (Psychology), Perception (Psychology), Motivation, Attitudes, Mental disorders, Anxiety, Abnormal psychology, Social psychology, Statistical analysis, Reliability

The report concerns three further studies conducted with the Picture Description Test (PDT) (Izard, Randall, and Cherry, 1963). The first study utilized an Army sample devising a key for that population which discriminated between three adjustment level groups. The second study devised a key for scoring tests at the high school level. In addition, other personality measures were correlated with PDT scores for subsets of this sample. The third study investigated the use of the PDT with hospitalized mental patients. There was no overlap or inversion of mean scores between the mean scores of patient and control groups, although the amount of variance prevented clearcut statistical separation of the two. (Author)

AD-626 752 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
VANDERBILT UNIV NASHVILLE TENN
THE EFFECTS OF EXPERIMENTER-AND PARTNERINDUCED AFFECT ON DYADIC PERFORMANCE.
Technical rept.,
by M. R. Katahn, R. M. Murphy, J. Fox, and C. E. Izard. Jul 65, 14p. Rept. no. TR-24
Contract Nonr-2149 (03)

Unclassified report

Descriptors: (*Performance (Human), Psychometrics), (*Psychometrics, Performance (Human)), Performance tests, Reaction (Psychology), Behavior, Perception (Psychology), Males, Females

The study investigated the effects of partner-induced and experimenter-induced affect upon Ss' performance on various tasks. Partner-induced affect was manipulated by administering a measure of positive interpersonal affect (Izard, 1962) and pairing similarlyscoring Ss, both at the high and low ends of the continuum. Experimenter-induced affect was either positve or negative. Sex of Ss also was controlled. The tasks were administered to pairs of Ss. Tasks 1 and 2 required only individual effort, the partner serving only to record responses. Tasks 3, 4, and 5 required cooperation of Ss and creativity in varying degrees. Task 6 required cooperation and agreement. Task 7 was a rating of partner. Results show dissimilar effects between partner-induced and experimenter-induced affect. Direction of the effects seems to be specific to the type of task and to the sex of S. (Author)

AD-626 753 Fld. 5/10
CFSTI Prices: HC $2.00 MF $0.50
VANDERBILT UNIV NASHVILLE TENN
CHARACTERISTICS OF THE VOLUNTEER FOR PSYCHOLOGICAL INVESTIGATIONS.
Technical rept.,
by John P. Ora,Jr.. Nov 65, 48p. Rept. no. TR-27
Contract Nonr-2149 (03)

Unclassified report

Descriptors: (*Psychometrics, Abnormal psychology), (*Abnormal psychology, Psychometrics), Personality, Motivation, Attitudes, Neuroses, Fear, Anxiety, Behavior, Social psychology, Group dynamics

On the basis of the relevant experimental data, volunteering (vg) for psychological experiments is considered as a function of background, message, and personality variables. The important methodological distinction between volunteers and psuedo-volunteers is stressed. A comprehensive survey and summarization of the literature suggests that the less socio-cultural influences favor volunteering, the more volunteers will tend to be unaware of social desirability, unconventional, neurotic, and introverted than nonvolunteers. It was concluded that an appropriate question to be asked in evaluating volunteers for psychological investigation is not whether they are representative of the population, but on what dimensions they are unrepresentative; and whether the particular dimensions on which they are unrepresentative defeat the purposes of the investigation. (Author)

AD-627 182 Fld. 5/10
CFSTI Prices: HC $4.00 MF $0.75
WASHINGTON UNIV SEATTLE
ANGER-AROUSING INSTRUCTIONS AND THE SIMPLEX IN A PERSONALITY QUESTIONNAIRE,
by Bruce McArthur Bloxom. Jan 66, 114p. Contract Nonr-477 (33) ,PHS-MH00743-08

Unclassified report

Descriptors: (*Personality, Psychometrics), (*Psychometrics, Factor analysis), Stress (Psychology), Anxiety, Programming (Computers), Statistical analysis, Correlation techniques, Analysis of variance

The report develops a theoretical framework for the comparison of factor structures in personality assessment for the case of nonoverlapping samples of entities. Data are collected on three groups of subjects, each group performing under a different set of instructions. The data are analyzed using a simplex-free and a simplex-confounded statistic. There is evidence that scalable aspects of the instructions can predict the effect of the instructions on the factor structures obtained under those instructions. The simplex-free statistic reveals instructions effects differently and is less reliable than the simplex-confounded statistic. (Author)

AD-627 214 Fld. 5/10
CFSTI Prices: HC $3.00 MF $0.75
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
PILOT STUDIES OF TEAM EFFECTIVENESS.
Research memo.,
by Clay E. George, George R. Hoak, and John Boutwell. Feb 63, 66p. Contract DA-44-188-ARO-2

Unclassified report

Descriptors: (*Group dynamics, Effectiveness), Performance (Human), Motivation, Performance tests, Problem solving

Methods of inducing intrateam coordination were tested for their effects on team performance in five-man groups. Twenty such teams were formed, ten experimental and ten control. It was found that intrateam coordination could be induced in teams by differentially reinforcing such behaviors. It was also found that motivation to coordinate one's responses with those of other team members could be increased by appropriate experimental manipulations. Finally, greater increases in cohesion were found in experimental than in control teams. Implications of these results for theory and for application are discussed. Attention is focused, however, on the use of these results as guidelines for future research. These are primarily pilot experiments. (Author)

AD-627 258 Fld. 5/10, 5/9
CFSTI Prices: HC $4.00 MF $0.75
NAVAL SCHOOL OF AVIATION MEDICINE PENSACOLA FLA
TOWARD AN OPTIMAL METHOD OF EQUATING SUBGROUPS COMPOSED OF DIFFERENT SUBJECTS,
by Robert J. Wherry,Jr.. 4 Aug 64, 103p. Rept. no. Mono-9

Unclassified report

Descriptors: (*Psychometrics, Standardization), (*Aviation personnel, Selection), Test construction (Psychology), Errors, Naval personnel, Naval training, Equations, Iterative methods, Optimization, Analysis of variance

Whenever two or more individuals are to be compared on the basis of scores obtained from different evaluators, certain differential non-equivalence errors should be removed from their scores. A rationale for understanding how these non-equivalence errors affect a set of scores is presented. Various non-equivalence errors such as 'leniency,' 'exaggeration,' 'floor and ceiling,' 'differential treatment of extremes,' and various 'composition' effects such as differential emphasis of factors, reliability, and validity are included in the rationale. The confounding effect of differential spread of ability and differential average ability among subgroups is discussed. The problem of optimally removing non-equivalence errors involves finding the best variable or compostie of variables to use as a 'standardization' variable against which the data from different evaluators may be equated. Two methods for accomplishing this goal are described. The superiority of a nonlinear solution, rather than a linear solution was demonstrated. Cross validation results are also presented. (Author)

AD-627 260 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
ELECTRONIC SYSTEMS DIV L G HANSCOM FIELD MASS DECISION SCIENCES LAB
IMMEDIATE RETRIEVAL OF VERBAL SERIES AS A FUNCTION OF STIMULUS GROUPING.
Technical documentary rept.,
by William H. Sumby. Oct 65, 21p. Proj. AF-7682 Task 768201
ESD TR-65-554

Unclassified report

Descriptors: (*Word association, Learning), (*Learning, Word association), Recall, Response, Verbal behavior

Four questions were investigated. (1) Is the learning rate enhanced if disconnected words are presented visually in clusters, e.g., pairs of quadruples, rather than individually and successively. (2) If changes do occur, and in a lawful fashion, can such differences be accounted for adequately in terms of the development of differential interitem association strengths as a function of such stimulus arrangement. (3) What differences, if any,

become evident in freerecall serial position curves by such organization. (4) How is the order of responding affected by clustering. It was found that clusetering will enhance learning rate, but that the limits are extremely restricted. It was revealed that such stimulus arrangements do affect the build-up of differential interitem association strengths, but this again is within the limits alluded to above. Apparently, differential associative strengths developed by clustering markedly affect the shapes of the serial position curves for the different groups. Clustering affects the strategy an individual adopts in responding. Such became evident in the typically different orders of responding for the various conditions. (Author)

AD-627 011 See Fld. 5/9

AD-627 179 See Fld. 5/9

5/11. SOCIOLOGY

AD-627 056 See Fld. 6/5

AD-627 205 See Fld. 5/4

Field 6-BIOLOGICAL AND MEDICAL SCIENCES

6/1. BIOCHEMISTRY

AD-626 855 Fld. 6/1
CFSTI Prices: HC $1.00 MF $0.50
STATE UNIV OF NEW YORK ALBANY RESEARCH FOUNDATION
OXIDATION OF THE S-METHYL GROUP BY TISSUE PREPARATIONS.
Final rept. 1 Jun 61-15 Oct 65,
by Edward J. Kuchinskas. 17 Jan 66, 10p. Contract Nonr-1349 (04) Proj. NR-108-526
Unclassified report

Descriptors: (*Organic sulfur compounds, Oxidation), (*Methionine, Oxidation), (*Enzymes, Oxidation), (*Tissue extracts, Enzymes), (*Catalase, Organic sulfur compounds), Tissues (Biology), Carbon dioxide, Hydrogen peroxide, N-heterocyclic compounds

An enzymic activity was detected in tissue homogenates capable of oxidizing the methyl group of methionine and other S-methyl compounds, completely to carbon dioxide. The activity is present in the highest concentrations in liver and kidney; smaller concentrations are found in brain, heart, skeletal muscle, and erythrocytes. Stable semi-purified preparations were prepared from rat liver. Experiments with crystalline beef liver catalase and the rat liver enzyme preparations clearly demonstrated the involvement of catalase in the S-methyl group oxidation process. Various hydrogen peroxide generating systems, both enzymic and chemical, can propagate the peroxidation of the s-methyl groups by catalase. Highly purified rat liver catalase was isolated and was shown to possess similarperoxidation properties as does beef liver catalase. Addition of soluble fractions from rat liver markedly stimulates the peroxidation of S-methyl groups by the rat liver catalase. The involvement of catalase in the oxidation of S-methyl groups to carbon dioxide in vivo was demonstrated by experiments with 3-amino-1,2,4-triazole. This compound inhibits both the catalatic and methyl oxidizing activities of rat liver in a generally proportional manner. (Author)

AD-626 916 Fld. 6/1
COLUMBIA UNIV NEW YORK COLL OF PHYSICIANS AND SURGEONS
OPTICAL ACTIVITY AND CONFORMATION OF CARBOHYDRATES. I. OPTICAL ROTATORY DISPERSION STUDIES ON IMMUNOCHEMICALLY REACTIVE AMINO SUGARS AND THEIR GLYCOSIDES, MILK OLIGOSACCHARIDES, OLIGOSACCHARIDES OF GLUCOSE, AND BLOOD GROUP SUBSTANCES.
Revised ed.,
by Cherman Beychok, and Elvin A. Kabat. 13 Aug 65, 10p. Contract PHS-GM-10576 ,NSF-GB-1913
Unclassified report

Revision of manuscript received 21 Jun 65.

Availability: Published in Biochemistry v4 n12 p2565-74 1965. Copies to DDC users only.

Descriptors: (*Carbohydrates, Molecular rotation), (*Molecular rotation, Carbohydrates), (*Stereochemistry, Carbohydrates), Spectroscopy, Immunology, Amines, Glycosides, Polysaccharides, Glucose, Blood groups, Dextrins, Spectra (Visible + ultraviolet)

Optical rotatory dispersion (ORD) spectra of a few selected carbohydrates and of the blood group A, B, and H substances are presented. The maltose and isomaltose series of oligosaccharides, the cyclic Schardinger dextrins, and amylose exhibit simple dispersion curves over the spectral region 589-200 millimicrons, with Drude dispersion wavelengths nearly the same for all but maltose. The blood group substances and Type XIV pneumococcal polysaccharide exhibit pronounced negative Cotton effects with troughs near 220 millimicrons. These Cotton effects are shown to be associated with the 2-acetamido (N-acetyl) group. An example of possible analytical utility is the requirement, from the ORD data, that the N-acetyl-D-glucosamine residues of Type XIV pneumococcal polysaccharide must be branched, in agreement with methylation studies of others. (Author)

AD-627 055 Fld. 6/1
CFSTI Prices: HC $1.00 MF $0.50
SAO PAULO UNIV (BRAZIL) SCHOOL OF MEDICINE OF RIBEIRAO PRETO
STUDIES ON THE MECHANISM OF BIOGENIC AMINE RELEASE.
Annual technical rept. no. 1, 1 Sep 64-30 Nov 65,
by Adolfo Max Rothschild. Dec 65, 20p. Contract DA-ARO-49-092-64-G29 Proj. DA-2N014501B71D-00-009-LA
Unclassified report

Descriptors: (*Histamine, Metabolism), (*Glycolysis, Inhibition), Glucose, Transport properties, Cells (Biology), Membranes (Biology), Tissues (Biology), Epinephrine, Serotonin, Venoms, In vitro analysis, Phospholipids, Enzymes, Anaphylaxis, Skin, Polysaccharides, Sulfates, Chromatographic analysis, Blood plasma, Brazil

Effects of inhibitors of the Embden-Meyerhof pathway of glycolysis as well as effects of inhibitors of glucose transport across cell membranes on the release of histamine from rat tissues exposed to a 'chemical' releaser (Compound 48-80) are studied. Potentiating effects of 2-4-dinitrophenol and of epinephrine on the spontaneous granule and histamine discharge occurring in rat tissue 'in-vitro' are also examined. It is concluded that in order to release histamine, mast cells must be able to draw upon metabolic stores which can be degraded by an anaerobic pathway, most probably glycolysis. Investigations about the role of phospholipase A on the histamine releasing response of rat mast cells revealed that this enzyme requires the presence of extracellular phospholipid substrates and is probably not involved in mast cell response to compound 48/80. An examination of the relative importance of histamine and bradykinin on the production of the symptoms of passive cutaneous anaphylaxis in the rat, revealed that the latter is the mediator of this reaction. The experimental approach which yielded this result, involved the use of sulfated polysaccharides as activators of the bradykinin-releasing system of plasma. (Author)

AD-627 062 Fld. 6/1
CFSTI Prices: HC $1.00 MF $0.50
NORTH SHORE HOSPITAL MANHASSET NY
DEVELOPMENT OF THEORY TO UNIFY MECHANISMS OF ENZYME CATALYSIS AND DENATURATION.
Final rept., 1 Jul 64-30 Jun 65,
by Morris London. 30 Jun 65, 6p. Contract DA-49-193-MD-2228
Unclassified report

Descriptors: (*Phosphoric monoester hydrolases, Inhibition), (*Enzymes, Theory), Catalysis, Ultraviolet radiation, Propanols, Urea, Guanidines, Sulfonates, Toluenes, Alkali metal compounds, Chlorides, Reaction kinetics

Study of the denaturation of prostatic acid phosphatase was continued. Denaturation of the enzyme with ultraviolet radiation over a range of carefully controlled temperatures from -30 to 50C. was carried out in specially designed apparatus. The denaturation rate was also measured using urea or n-propanol in combination with ultraviolet radiation. Comparison was made with rates obtained using urea with the addition of other chemical agents already investigated: guanidine-hydrochloride, sodium p-toluene sulfonate, and n-propanol. The effect on the denaturation rate of acid phosphatase was also measured using two series of chemical compounds: chlorides of the alkali metals and methylated urea compounds: symmetrical dimethyl urea and tetramethyl urea. (Author)

AD-627 108 Fld. 6/1
ARMY RESEARCH INST OF ENVIRONMENTAL MEDICINE NATICK MASS BIOCHEMISTRY LAB
MODIFIED ENZYMATIC PROCEDURE FOR THE ROUTINE DETERMINATION OF GLYCEROL AND TRIGLYCERIDES IN PLASMA,
by Carmine J. Spinella, and Milton Mager. 1 Jun 65, 3p.
Unclassified report

Availability: Published in Journal of Lipid Research v7 p167-9 Jan 1966. Copies to DDC users only.

Descriptors: (*Glycerols, Determination), (*Blood chemistry, Glycerols), Blood plasma, Enzymes, Ethers, Tissues (Biology), Phosphoric acids, Colorimetric analysis, Test methods

A modification of Wieland's enzymatic procedure for glycerol analysis is presented. It is simple and precise, and readily applicable to the routine analysis of plasma and tissue glycerol and triglycerides. Optimal precision is obtained in samples containing 0.003-0.400 micro mole of glycerol per ml, which in this method is equivalent to plasma levels of 0.011 to 1.40 micro moles/ml. (Author)

AD-626 784 See Fld. 7/5

AD-626 792 See Fld. 7/3

6/3. BIOLOGY

AD-626 871 Fld. 6/3
COLUMBIA UNIV NEW YORK COLL OF PHYSICIANS AND SURGEONS
DNA AND THE EMBRYONIC DEVELOPMENT OF THE AMERICAN SEA URCHIN, ARBACIA PUNCTULATA,
by Herbert S. Rosenkranz. 1965, 2p. Contract Nonr-266 (89) Proj. NR-103-574
Unclassified report

Availability: Published in Biological Bulletin v129 n2 p419 Oct 1965. Copies to DDC users only.

Descriptors: (*Echinodermata, Embryos), (*Embryology, Desoxyribonucleic acids), (*Desoxyribonucleic acids, Echinodermata), Density, Eggs, Growth, Cells (Biology)

Findings were reported recently on the properties of the DNA's isolated from the egg, sperm and adult diploid tissues of Arbacia punctulata. It was found that the DNA isolated from the two haploid cells had a similar buoyant density of 1.700 g./cc. This can be taken to mean that the DNA's from these sources have identical base compositions. On the other hand, the DNA derived from adult diploid cells exhibited a buoyant density of 1.702 g./cc. If this difference in the density values of the DNA of haploid and diploid cells reflects a real shift in base composition, it is indeed a most unexpected finding. For this reason an investigation was undertaken to study the properties of the DNA isolated at various stages of embryonic development. It was thus found that a buoyant density of 1.700 g./cc. was exhibited by the DNA's isolated from the fertilized egg prior to cleavage, from the two- and sixteen-cell stages and from morulae. The DNA from blastulae had a density of 1.701 g./cc., while the material isolated from gastrulae and plutei exhibited a density of 1.702 g./cc. It was ascertained that these differences were real, by isolating specimens at each stage by two different procedures and analyzing each sample at least twice. These may indicate an active role for DNA in cellular differentiation. (Document quoted in its entirety.)

AD-626 872 Fld. 6/3
COLUMBIA UNIV NEW YORK COLL OF PHYSICIANS AND SURGEONS
PRELIMINARY CHARACTERIZATION OF NONNUCLEOTIDE MACROMOLECULE FOUND IN THE DNA ISOLATED FROM THE SAND DOLLAR, ECHINARACHNIUS PARMA,
by Herbert S. Rosenkranz. 1965, 2p. Contract Nonr-226 (89) Proj. NR-103-574

Unclassified report

Availability: Published in Biological Bulletin v129 n2 p419-20 Oct 1965. Copies to DDC users only.

Descriptors: (*Echinodermata, Desoxyribonucleic acids), (*Desoxyribonucleic acids, Echinodermata), Density, Nucleotides, Hydrolysis, Electrophoresis, Amino acids, Carbohydrates, Hexoses, Amines

Cesium chloride density gradient centrifugation of DNA isolated from Echinarachnius parma reveals the presence of two bands. The major band of density 1.700 g./cc exhibits the properties commonly associated with DNA. The density of the second band (1.682 g./cc) indicates that this material may be a co-polymer of deoxyadenylate-thymidylate. Further analysis, however, revealed that this material was resistant to DNase and to heat denaturation in the presence of formaldehyde, thus casting doubt on its nucleotide character. Several procedures were used in an attempt to isolate, in pure form, this unusual component. Fractionation of a DNase digest on Sephadex G-100 was the method finally adopted to achieve this purpose. The material so obtained did not exhibit a nucleic acid-like spectrum. It had a sedimentation coefficient of approximately 900S. Upon acid hydrolysis and electrophoretic separation, the presence of amino acids, reducing sugars and hexosamines was revealed. The exact nature and function of this material are under continued investigation. (Document quoted in its entirety.)

AD-626 873 Fld. 6/3
COLUMBIA UNIV NEW YORK COLL OF PHYSICIANS AND SURGEONS
A PRELIMINARY SURVEY OF THE PROPERTIES OF DNA DURING EMBRYONIC DEVELOPMENT,
by David Lipsky, and Herbert S. Rosenkranz. 1965, 2p. Contract Nonr-266 (89) Proj. NR-103-574

Unclassified report

Availability: Published in Biological Bulletin v129 n2 p413 Oct 1965. Copies to DDC users only.

Descriptors: (*Desoxyribonucleic acids, Embryology), (*Embryology, Desoxyribonucleic acids), Density, Embryos, Echinodermata, Chickens, Pelecypoda

Studies currently underway in this laboratory revealed that the DNA's isolated at various stages of embryonic development of the American sea urchin, Arbacia punctulata, exhibited a gradual shift in the values of their buoyant densities as a function of differentiation. In view of the unusual nature of this finding and its relevance to our understanding of the function of DNA during embryonic development, this study was extended to include other biological systems. Results obtained thus far are indicative of the possibility that changes in the buoyant densities of DNA during embryogenesis are widespread phenomena. Thus it was found that the DNA's isolated from four-, seven-, ten-, and twelve-day old chick embryos had buoyant densities of 1.702 sub o, 1.701 sub 6, 1.701 sub 1, and 1.700 sub 1, respectively. Similarly the DNA isolated from the sperm, fertilized egg and gills of the American oyster, Crassostrea virginica, exhibited buoyant densities of 1.699, 1.697 and 1.698 g./cc., respectively. In addition, to the main band (1.699 g./cc.), the DNA from sperm also showed a satellite band of density 1.720 g./cc. The deoxyribonucleic acids from a number of other species were also isolated and these await analysis. However, the results reported here appear to support the previous findings with Arbacia punctulata and they may indicate that the DNA present in the developing embryo undergoes structural or compositional modifications. (Document quoted in its entirety.)

AD-626 874 Fld. 6/3, 6/15
COLUMBIA UNIV NEW YORK COLL OF PHYSICIANS AND SURGEONS
PROPERTIES OF THE DNA ISOLATED FROM SPERM OF ARBACIA PUNCTULATA TREATED WITH HYDROXYUREA,
by John M. Van Praag, Eric J. Simon, and Herbert S.Rosenkranz. 1965, 2p. Contract Nonr-266 (89) ,PHS-MH-10227

Unclassified report

Availability: Published in Biological Bulletin v129 n2 p428 Oct 1965. Copies to DDC users only.

Descriptors: (*Desoxyribonucleic acids, Synthesis), (*Echinodermata, Desoxyribonucleic acids), (*Embryology, Desoxyribonucleic acids), Reproductive system, In vivo analysis, Fertility, Density, Urea

Previous studies with bacterial and mammalian cells showed that hydroxyurea (HU) is a specific and reversible inhibitor of DNA synthesis. In an effort to gain some understanding of the mechanism of action of this drug it was considered of interest to find out whether a direct in vivo effect of HU on the DNA contained in sperm of Arbacia punctulata could be demonstrated. For this purpose, sperm were exposed to a range of HU concentrations. After pre-determined intervals the drug was removed and a small portion of the sperm was used to determine their ability to fertilize normal eggs. The remaining sperm served as a source of DNA. The buoyant densities, as determined by CsCl density gradient centrifugation, were used to characterize the DNA specimens. It was thus found that whereas the DNA isolated from untreated sperm exhibited a unimodal gaussian distribution with a mean density of 1.700 g./cc., the DNA isolated from sperm rendered infertile by treatment with .01 M HU for 7 hours was bimodal with a major non-gaussian band of density 1.702 g./cc. and a minor component of density 1.719 g./cc. Very similar results were found with the DNA or newly-formed sperm obtained from animals that were exposed to .0001 M hydroxyurea for 4 days.

AD-626 889 Fld. 6/3
CHILE UNIV SANTIAGO
FUNCTIONAL ORGANIZATION OF THE PIGEON RETINA,
by H. R. Maturana. 1962, 11p. Contract AF-AFOSR-61-44 Proj. AF-9777 Task 977701 AFOSR 65-1968

Unclassified report

Availability: Published in Excerpta Medica International Congress (ser 49) v3 p170-8 1962. Copies to DDC users only.

Descriptors: (*Pigeons, Vision), (*Retina, Pigeons), (*Ganglia, Retina), Eye, Visual perception, Stimulation, Nerve cells, Nerve impulses, Optic nerve, Cats, Amphibians, Reptiles, Birds, Mammals, Inhibition, Luminescence, Colors, Illumination, Chile

The responses of the retinal ganglion cells of pigeons is studied when stimulated by specific visual configurations rather than luminous points. The cells are found to be grouped into six classes: verticality detectors, horizontality detectors, general edge detectors, directional moving edge detectors, convex edge detectors, and luminosity detectors. The first five do not respond to luminous stimuli in most cases but only to an adequate visual configuration. The retinal ganglion cells of the pigeon are compared to those of the cat and it is thought that they represent two types of visual systems: (1) a deterministic system in amphibians, reptiles and birds in which the function of the ganglion cells is highly specialized and unambiguous; and (2) an indeterministic system in mannals in which the function is unspecific and ambiguous. It is also suggested that complex cell functions are not achieved by simple algebraic summation of excitatory and inhibitory processes, but that these processes play a role of components in the configuration of afferent impulses. (Author)

AD-626 952 Fld. 6/3
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
GUIDED AERIAL NAVIGATION IN THE ANIMAL KINGDOM,
by Shih Wen, Wei Peng, and Yuan Hang. 6 Jan 66, 13p. Rept. no. FTD-TT-65-711 TT 66-60310

Unclassified report

Edited trans. of Hang K'ung Chih Shih (Chinese Peoples Republic), n4 p10-3 1964.

Descriptors: (*Animals, Navigation), (*Navigation, Animals), Birds, Fishes, Bats, Insects, Flight, Swimming, Direction finding, Celestial navigation, China

AD-627 102 Fld. 6/3
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS
PHYSIOLOGY OF INSECT DIAPAUSE. XV. THE TRANSMISSION OF PHOTOPERIOD SIGNALS TO THE BRAIN OF THE OAK SILKWORM, ANTHERAEA PERNYI,
by Carroll M. Williams, Perry L. Adkisson, and Charles Walcott. 1965, 11p.

Unclassified report

Supported by NSF, NIH, and ONR.

Availability: Published in Biological Bulletin v128 n3 p497-507 Jun 1965. Copies to DDC users only.

Descriptors: (*Diapause, Insects), (*Lepidoptera, Photoperiodism), (*Photoperiodism, Lepidoptera), Photosensitivity (Biological), Brain, Light, Intensity, Optical filters, Optical properties, Spectra (Visible + ultraviolet), Growth, Colors

The pupal diapause of Antheraea pernyi is sustained by exposure of cocoons to short-day conditions (daily photophases of 4 to 12 hours) and terminated after exposure to daily photophases of 15 to 18 hours. The photoperiod signal is conveyed by the direct action of violet, blue, and blue-green light (398-508 millimicrons) on the brain itself. This finding implicates a pink brain

pigment in the absorption of the effective wavelengths. Despite its opacity, the cocoon functions as a light-integrating sphere in the collection of scattered light -- especially of blue light ranging from 440 millimicrons to 510 millimicrons. After its collection within the cavity of the cocoon, the blue haze penetrates the pupal cuticle to act on the brain. The brain's photoperiod mechanism is saturated by less than 1 foot-candle of blue light. (Author)

AD-627 119 Fld. 6/3
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
THE UNIVERSE UNDER THE MICROSCOPE,
by A. L. Dmitriev. 3 Jan 66, 14p. Rept. no. ftd-TT-65-1341
TT 66-60374
Unclassified report

Unedited rough draft trans. of Vokrug Sveta (USSR) n9 p37-9 1963.

Descriptors: (*Space biology, Planets), Planetary atmospheres, Temperature, Cosmic rays, Microorganisms, Growth, USSR, Space environmental conditions

AD-627 244 Fld. 6/3
CFSTI Prices: HC $1.00 MF $0.50
IIT RESEARCH INST CHICAGO ILL
DEVELOPMENT OF AN ORALLY EFFECTIVE INSECT REPELLENT.
Quarterly progress rept., 11 Nov 65-31 Jan 66. 31 Jan 66, 24p. Rept. no. IITRI-L6021-5
Contract DA-49-193-MD-2281 Proj. IITRI-L6021
Unclassified report

See also AD-622 983.

Descriptors: (*Insect repellants, Effectiveness), (*Culicidae, Insect repellants), Mouth, Electronic recording systems, Statistical analysis, Collecting methods, Organic compounds, Pest control, Carbon dioxide

Additional compounds were analyzed for mosquito repellency by the electronic recording method, and further statistical analyses were performed. Work was initiated in two new areas, the trapping and the testing of effluents of animals for mosquito attractancy and the developing of a new approach toward elucidating the physiological basis of mosquito attraction.

AD-626 675 **See Fld. 17/2**

AD-626 706 **See Fld. 4/2**

AD-627 093 **See Fld. 6/20**

AD-627 212 **See Fld. 6/12**

6/4. BIONICS

AD-626 699 **See Fld. 5/10**

AD-626 819 **See Fld. 9/2**

AD-626 820 **See Fld. 9/2**

6/5. CLINICAL MEDICINE

AD-626 771 Fld. 6/5
CFSTI Prices: HC $2.00 MF $0.50
ARMY MEDICAL BIOMECHANICAL RESEARCH LAB WALTER REED ARMY MEDICAL CENTER WASHINGTON D C
THE BEOGRAD ELECTRONIC HAND. ANALYSIS AND RECOMMENDATIONS FOR FURTHER RESEARCH AND DEVELOPMENT,
by Fred Leonard, Lloyd L. Salisbury, and Albert B. Colman. 6 Nov 65, 31p.
Unclassified report

A Site Visit Study to Mihailo Pupin Inst., Belgrade (Yugoslavia), 26 Oct-6 Nov 65.

Descriptors: (*Prosthetics, Hands), (*Hands, Prosthetics), Electronic equipment, Control systems, Cybernetics

AD-626 908 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
STUDIES OF NECROSIS IN VITRO OF MOUSE HEPATIC PARENCHYMAL CELLS. ULTRASTRUCTURAL ALTERATIONS IN ENDOPLASMIC RETICULUM, GOLGI APPARATUS, PLASMA MEMBRANE, AND LIPID DROPLETS,
by Benjamin F. Trump, Peter J. Goldblatt, and Robert E. Stowell. 5 Jul 65, 30p.
Unclassified report

Availability: Published in Laboratory Investigation v14 n11 p2000-28 1965. Copies to DDC users only.

Descriptors: (*Necrosis, Cells (Biology)), Membranes (Biology), In vitro analysis, Electron microscopy, Lipids, Cell structure, Ribosomes, Cytoplasm, Enzymes, Cytochemistry, Glycogen, Histological techniques, Mice

The alterations in intracellular membrane systems in mouse hepatic parenchymal cells during the development of necrosis in vitro were studied by electron microscopy. Additional observations were made on the appearance of intracellular membrane systems in control mice. The endoplasmic reticulum and Golgi apparatus of normal fasted mice contain homogeneous rounded densities. These are more numerous in the Golgi apparatus. In mouse hepatocytes there is a system of membranous profiles, which parallels the lateral plasmalemmas, termed the paramembranous cisternal system. This may be a specialization of the endoplasmic reticulum with which it appears to communicate. Its function is unknown. The system appears to terminate a short distance from the bile canaliculus and sinusoid, respectively. During the development of necrosis in vitro the endoplasmic reticulum underwent a characteristic series of changes consisting of fragmentation and dilation of the cisternae, loss of patterned ribosomal agreegates, loss of ribosomes from the surface of the cisternae, and gradual disappearance of the ribosomes from the cytoplasm. These changes were correlated with chemical and functional studies of the endoplasmic reticulum, ribosomes, and polysomes and with cytochemical studies showing a gradual loss of cytoplasmic basophilia.

AD-626 915 Fld. 6/5
BAYLOR UNIV HOUSTON TEX COLL OF MEDICINE
EFFECTS OF AUTOLOGOUS AND HOMOLOGOUS BLOOD REPLACEMENT IN HYPOVOLEMIC DOGS,
28 Jun 65, 5p. Contract DA-49-193-md-2357, PHS-HE-08793
Unclassified report

Prepared in cooperation with Texas Univ., Houston, Dental Branch.

Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v120 p199-202 1965. Copies to DDC users only.

Descriptors: (*Blood transfusions, Blood volume), Hemorrhage, Blood pressure, Blood proteins, Blood plasma, Hematocrit, Erythrocytes, Dogs

Replacement of blood after a hemorrhage to 50 mm Hg mean arterial pressure with autologous, reconstituted autologous, and homologous blood results in a significantly higher venous hematocrit than expected, indicating shifting of red cells and plasma within the circulation. Mean arterial pressure, plasma volume, and concentration and total amount of protein were not significantly different from the 'expected' values. When reconstituted homologous blood was used as the replacement there was a significant reduction in plasma volume and total protein in addition to a steep rise in venous hematocrit. Urticaria was seen in 25% of the dogs receiving homologous blood and in 63% receiving reconstituted homologous blood, supporting the idea that handling of the blood to be transfused produces a substance causing urticaria. In the present experiments reconstituted blood, whether homologous or autologous, caused the loss of fluid and protein from the circulation. (Author)

AD-627 050 Fld. 6/5, 6/13
CFSTI Prices: HC $4.00 MF $0.75
CINCINNATI UNIV OHIO COLL OF MEDICINE
STUDIES IN THE NATURE AND CONTROL OF SEPSIS IN THERMAL AND COMBINED THERMALIRRADIATION INJURIES.
Annual rept.,
by William A. Altemeier. 15 Nov 65, 107p. Contract DA-49-193-MD-2094
Unclassified report

Descriptors: (*Thermal radiation, Wounds + injuries), (*Burns, Infections), Bacteria, Immunity, Mortality rates, Excision, Effectiveness, Germ-free animals, Hospitals, Convalescence, Resistance (Biological), Antibiotics, Transplantation, Surgery, Staphylococcus aureus, Pseudomonas aeroginosa, Aerobacter, Klebsiella, Proteins, Culture media, Biological contamination, Tables

The work has been concerned with the continued exploration of various problems related to infections associated with thermal injuries. The investigations have been both laboratory and clinical and have consisted of the following: (1) A continuing study of the significance of the changing bacterial flora in severe burns. (2) Studies on the influence of the immune response upon morbidity and mortality in experimental and clinical burns. (3) Studies of the effectiveness of early excision on mortality and morbidity of burn patients. (4) Frequency, nature, and significance of the non-sporulating anaerobic bacteria and the mechanisms of synergism illustrated by these organisms in polymicrobic infections. (5) Studies of the response and natural course of the burn would in germ-free animals given a standard burn and maintained in a germfree environment. (6) Continuing clinical and laboratory studies of all burn patients treated on the surgical wards of the Cincinnati General Hospital. (Author)

AD-627 056 Fld. 6/5, 5/11
CFSTI Prices: HC $2.00 MF $0.50
UNIVERSIDAD DE LOS ANDES BOGATA (COLOMBIA) FACULTAD DE ARTES Y CIENCIAS
COMMUNICATION IN THE DOCTOR-PATIENT RELATIONSHIP.
Annual rept. no. 1, 15 Jul 64-30 Nov 65,
by Antonio Ordonez-Plaja. 30 Nov 65, 35p.
Contract DA-ARO-49-092-64-G56 Proj. DA-2N014501B71D-00 Task 2N014501B71D-00-018-LA
Unclassified report

Descriptors: (*Medical personnel, Social communication), (*Social communication, Public health), Colombia, Sociometrics, Vocabulary, Psychometrics

The purpose of the study was to evaluate some of the causes that may interfere with doctor-patient communication: (1) Vocabulary knowledge of 'common' medical terms on the part of patients. Such variables as socio-economic status, origin (urban or rural), education, age and sex will be considered. (2) Degree of understanding by both doctor and patient, to be measured by means of separate interviews that will be checked against the tape-recorded doctorpatient interview. (3) Presen-

tation of self by both doctor and patient during the medical interview and its influence in 'rapport'. (4) Social distance between doctor and patient and degree of social mobility of each.

AD-627 123 Fld. 6/5
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ENAMEL SOLUBILITY OF DECIDUOUS AND PERMANENT TEETH,
by V. S. Borzhim, and R. F. Sinitsyn. 4 Jan 66, 13p. Rept. no. FTD-TT-65-1357
TT 66-60377
Unclassified report

Unedited rough draft trans. of Stomatologiya (USSR) v42 n4 p11-5 1963.

Descriptors: (*Teeth, Solubility), Surface area, Powders, USSR, Acids, Analysis of variance

Two variants of the procedure for determining the surface of the enamel of a tooth were developed. The solubility of the enamel for the different teeth is subject to considerable fluctuations. The difference in the solubility of the enamel between the deciduous and the permanent teeth proves to be quite well founded. The average value for the solubility of the deciduous teeth considerably exceeds that of the permanent teeth. (Author)

AD-627 142 Fld. 6/5, 9/2
CFSTI Prices: HC $2.00 MF $0.50
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
CRITERIA FOR ESTABLISHING LOCALLY OPTIMAL DIAGNOSTIC TEST SEQUENCES,
by Earl B. Hunt. Oct 65, 27p. Rept. no. WMSI Working Paper-88
Contract Nonr-233 (75) Proj. NR-047-041
Unclassified report

Prepared in cooperation with Sydney Univ. (Australia). Grant PHS-MH-07567-02.

Descriptors: (*Diagnosis, Classification), (*Medical examination, Statistical tests), Sequential analysis, Public health, Algorithms, Costs, Statistical analysis, Programming (Computers), Australia

In determining diagnostic procedures a rule for assigning cases to classes is desired. Each case is describable by stating its value on a number of attributes. Only one attribute may be examined at a time, and there is a cost for determining the value of each attribute. Therefore, the appropriate method of classification is by a tree of sequential tests. Algorithms for examining a (large) file of cases of known class membership to produce a diagnostic rule are developed. The choice of a particular algorithm depends jointly upon the cost factors involved and the nature of the acts which result for tentative diagnosis of a case as a member of a class. (Author)

AD-627 152 Fld. 6/5, 9/2, 5/7
CFSTI Prices: HC $5.00 MF $1.00
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
SURVEY OF LIFE SCIENCES COMPUTER PROGRAMS.
Final rept. 15 Jul 63-14 Jul 64,
by Ibrahim B. Hammidi, Lilliam Dresher, and Carol S. Wade. Nov 65, 181p. Contract AF33 (657)-11347 Proj. AF-7233 Task 723305
AMRL TR-65-113
Unclassified report

Descriptors: (*Medicine, Programming (Computers)), (*Programming (Computers), Medicine), (*Information retrieval, Medicine), Indexes, Statistical analysis, Diagnosis

A need exists for dissemination of information on the uses of computers in the life sciences. This report attempts to provide the information necessary to locate and request programs or program descriptions and listings. Typical applications in the life sciences are described for general programs on information retrieval, cross-tabulation of data, tests of statistical hypotheses, regression analysis, multivariate analysis, time series analysis, analysis of variance and covariance, mathematical diagnosis, linear programming, simulation, numerical techniques, and matrix algebra. In addition to these general purpose programs, many special purpose programs exist which are applicable within the gamut of research problems. Some specific examples are finding interatomic distances and angles, blood volume analysis, cardiac arrythmia analysis, etc. The Key-word-in-Context (KWIC) - Index of life sciences computer programs consisting of (1) the Key-Word Index, (2) Author Index, and (3) Code-Name Index is given in the final section of the report. (Author)

AD-627 176 Fld. 6/5
NAVAL DENTAL SCHOOL BETHESDA MD
NEUROBLASTOMA WITH METASTASIS TO THE MANDIBLE: REPORT OF CASE,
by S. Hoffman, and G. H. Green. 1964, 8p.
Unclassified report

Availability: Published in Journal of Oral Surgery v24 p75-82 Jan 1966. Copies to DDC users only.

Descriptors: (*Neoplasms, Autonomic nervous system), (*Autonomic nervous system, Neoplasms), Head, Mouth, Medical examination, Dentistry, Nerve cells, Cell structure, Musculoskeletal system, Neuromuscular system, Pathology, Biopsy, Histology, Ganglia, Cancer, Etiology, Embryology, Surgical techniques, Children, Diagnosis

A four-year-old girl was found to have neuroblastoma with secondary mandibular involvement. There were three prominent signs that the examining dentist should be able to recognize and understand well enough to discuss intelligently with a medical consultant: the ocular proptosis, the mandibular swelling and the symptom complex of enophthalmos, homolateral flushing, ptosis, miosis and anhidrosis, which in part or together should suggest Horner's syndrome. (Author)

AD-626 682 **See Fld. 6/18**

AD-626 830 **See Fld. 6/12**

AD-627 087 **See Fld. 6/12**

AD-627 211 **See Fld. 6/12**

6/6. ENVIRONMENTAL BIOLOGY

AD-627 194 Fld. 6/6, 6/20
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF NUTRITION AND FOOD SCIENCE
RESPONSES OF CELL CULTURES TO INSECTICIDES, I. ACUTE TOXICITY TO HUMAN CELLS,
by Janis Gabliks, and Leo Friedman. 11 Jun 65, 6p. Contract DA-49-193-md-2533 ,PHS-CA-06988-01
Unclassified report

Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v120 p163-8 1965. Copies to DDC users only.

Descriptors: (*Insecticides, Toxicity), (*Tissue culture cells, Insecticides), Organic phosphorus compounds, Chlorine compounds, Nitrogen compounds, Phenols, Dosage, Pathology, Growth, Inhibition, Proteins, Synthesis, Morphology (Biology)

Human Chang liver and HeLa cells were exposed to organophosphorus, organochlorine, and dinitrophenol insecticidal compounds. The acute cytotoxicity was measured during 48-hour incubation and the effects expressed in two ways: the toxic dose (TD50) based on cytopathological effects observed microscopically; and the growth inhibition (ID50) based on inhibition of cell protein synthesis. Results by each criterion closely correlated but the growth inhibition test was generally more sensitive. All insecticides tested were cytotoxic in both cell lines and induced progressive morphological changes leading to destruction of cells. For liver cells the ID50 values ranged from 0.3 micrograms g to 170 micrograms g per ml of medium. For HeLa cells the results were approximately the same. Dinitrophenol insecticides were relatively more toxic than organochlorine and organophosphorus compounds. (Author)

AD-627 195 Fld. 6/6, 6/20, 6/13
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF NUTRITION AND FOOD SCIENCE
RESPONSES OF CELL CULTURES TO INSECTICIDES III. ALTERED SUSCEPTIBILITY TO POLIOVIRUS AND DIPHTHERIA TOXIN,
by Janis Gabliks. 11 Jun 65, 4p. Contract DA-49-193-md-2533 ,PHS-CA-06988-02
Unclassified report

Availability: Published in Proceedings of The Society for Experimental Biology and Medicine v120 p172-5 1965. Copies to DDC users only.

Descriptors: (*Insecticides, Toxicity), (*Tissue culture cells, Insecticides), (*Poliomyelitis virus, Resistance (Biological)), (*Corynebacterium, Resistance (Biological)), Biosynthesis, Toxins + antitoxins, Test methods

HeLa cell cultures were maintained in the presence of insecticides for periods up to 108 days. At certain intervals the treated cells were subcultured without insecticides and then infected with poliovirus or submitted to reaction with diphtheria toxin. The Cygon-, Dipterex-, DI-Syston-, chlordane-, and Karathane-treated cultures were more susceptible to poliovirus infection and the infected cells degenerated more rapidly. The malathion-treated cells did not show any change in susceptibility. The Karathane-treated cells were 10 times more resistant to the lethal action of diphtheria toxin than the control. Other treated cultures showed no changes with respect to diphtheria toxin reactivity. The results indicate some alterations in physiology of the insecticide-treated cells which affect the cell response to 2 other biologically active agents--poliovirus and diphtheria toxin. (Author)

AD-627 199 Fld. 6/6, 6/20
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF NUTRITION AND FOOD SCIENCE
RESPONSES OF CELL CULTURES TO INSECTICIDES. II. CHRONIC TOXICITY AND INDUCED RESISTANCE,
by Janis Gabliks. 11 Jun 65, 4p. Contract PHS-CA-06988-01
Unclassified report

Availability: Published in Proceedings of The Society for Experimental Biology and Medicine v120 p168-71 1965. Copies to DDC users only.

Descriptors: (*Insecticides, Toxicity), (*Tissue culture cells, Insecticides), (*Resistance (Biological), Insecticides), Growth, Inhibition, Adaptation (Physiology), Mutations, Enzymes, Metabolism

HeLa cell cultures were exposed to subtoxic concentrations of insecticides for 84 days. All insecticides tested induced cytotoxicity which was characterized by growth inhibition and cell destruction. The minimal toxic doses (MTD) in micrograms/ml were: Cygon 20, Dipterex 10, DI-Syston 5, Kelthane 5, Karathane 5, malathion 0.1, and chlordane 0.1. All insecticides, except Karathane, were significantly more toxic in the chronic than in the

acute cytotoxicity tests. On continued exposure, the cells gradually adapted and grew in the presence of the insecticides at concentrations 2 to 200 times above the MTD. After cessation of exposure the malathion-, chlordane-, and DI-Syston-treated cultures were 1.7 to 3.0 times more resistant to the same insecticide than the untreated control cells. The induced resistance to DI-Syston and chlordane was associated with a growth stimulatory effect of each insecticide on the respective chronically treated culture. It is postulated that the cell resistance to insecticides may be associated with cell mutations or induction of enzyme systems capable of inactivating or metabolizing the insecticides. (Author)

6/8. FOOD

AD-626 791 Fld. 6/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
LIST OF DECREES, ORDERS, AND INSTRUCTION CURRENTLY IN EFFECT WITH REGARD TO VITAMIN CONTROL,
by M. G. Shevchenko. Dec 65, 6p. Rept. no. FSTC-381-T65-649
TT 66-60285

Unclassified report

Trans. of mono. Sbornik Vazhneishikh Ofitsialnykh Materialov po Voprosam Gigieny Pitaniya, Moscow, 1963 p597-8.

Descriptors: (*Public health, USSR), (*Bitamins, Standards), Food

AD-626 793 Fld. 6/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
SANITARY REGULATIONS COVERING THE COLORING OF FOOD PRODUCTS, FLAVORINGS, AND BEVERAGES,
by M. G. Shevchenko. Dec 65, 6p. Rept. no. FSTC-381-T65-658
TT 66-60287

Unclassified report

Trans. of mono. Sbornik Vazhneishikh Ofitsialnykh Materialov po Voprpsam Gigieny Pitaniya, n. p. 1963 p78-9.

Descriptors: (*Food, Coloring), (*Beverages, Coloring), Dyes, Standards, Sanitary engineering, Public health, USSR

AD-626 794 Fld. 6/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
REFINED SUGAR WITH ADDED VITAMIN C (ASCORBIC ACID) TECHNICAL INSTRUCTIONS STU 36-152-61,
by M. G. Shevchenko. Dec 65, 6p. Rept. no. FSTC-381-T65-656
TT 66-60288

Unclassified report

Trans. of mono. Vazhneishikh Ofitsialnykh Materialov po Voprosam Gigieny Pitaniya, n. p. 1963 p601-3.

Descriptors: (*Vitamins, Standards), (*Carbohydrates, Ascorbic acid), (*Food, Vitamins), Acceptability, Labels, Packaging, Test methods, Storage, Transportation, USSR

AD-626 796 Fld. 6/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
PROVISIONAL TECHNICAL INSTRUCTIONS ON THE VITAMINIZATION OF MILK, KEFIR AND SOUR MILK WITH ASCORBIC ACID,
by M. G. Shvchenko. Dec 65, 5p. Rept. no. FSTC-381-T65-657
TT 66-60290

Unclassified report

Trans. of mono. Sbornik Vazhneyshikh Ofitsial'nykh Materialov po Voprosam Gigienii Pitaniya, Moscow, 1963 p600.

Descriptors: (*Milk, Ascorbic acid), (*Ascorbic acid, Milk), Vitamins, Chemical analysis, Nutrition, Children, Processing, USSR

AD-626 797 Fld. 6/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
MEAT STORAGE AT -2 TO -5C. CARBONATED SOUR-MILK DRINKS.
Dec 65, 8p. Rept. no. FSTC-381-T65-645
TT 66-60291

Unclassified report

Trans. of Sovetskaya Torgovlya (USSR) v38 n7 p40-2 1965.

Descriptors: (*Meat, Storage), (*Beverages, Preparation), Temperature, Frozen foods, Acceptability, Processing, Transportation, Milk, USSR

AD-626 948 Fld. 6/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
SANITARY REGULATIONS FOR THE AROMATIZATION OF FOOD PRODUCTS WITH SYNTHETIC PERFUMES AND AROMATIC FOOD ESSENCES,
by M. G. Shevchenko. Dec 65, 8p. Rept. no. FSTC-381-T65-661
TT 66-60306

Unclassified report

Trans. of mono. Sbornik Vazhneyshikh Ofitsialnykh Materialov po Voprosam Gigienii Pitaniya, n.p. 1963 p92-4.

Descriptors: (*Food, Aromatic compounds), Beverages, Processing, Standards, Odors, USSR

AD-626 984 Fld. 6/8, 15/3
CFSTI Prices: HC $2.00 MF $0.50
WESTERN REGIONAL RESEARCH LAB ALBANY CALIF
BULGUR WAFER AND ADJUNCTS FOR FALLOUT SHELTER RATIONS.
Annual rept., 1 Jul 64-30 Jun 65,
by Allan D. Shepherd, Robert E. Ferrel, Robert J. Horvat, Hawkins Ng, and William G. Lane. Nov 65, 48p. Contract OCD-OS-62-54 Proj. OCD-1300 Task 1310

Unclassified report

Descriptors: (*Fallout shelters, Food), (*Food, Storage), Wheat, Linoleic acid, Oxidation, Taste, Tests, Odors, Stability, Vapors, Chromatographic analysis, Mass spectroscopy, Preparation, Degradation, Packaging, Civil defense systems

Vapors from rancidifying bulgur and from autoxidized methyl linoleate, a model compound, are being analyzed and identified by gas liquid chromatography and mass spectrometry. Thirty-one compounds have now been tentatively identified in studies on the model system. The presence of some of these compounds in vapors from rancid bulgur has been verified. We have made further study of gun-puffing and hot-air puff-drying as alternate means of preparing wheat ingredients for the wafer. Development of a jelly that sets with cold water essentially concludes development work on adjuncts. Long-term (five-year) storage studies of bulgur wafers and adjuncts are continuing. Taste panel evaluations to date indicate that shelf life of both types of products can be extended with nitrogen-packaging. The use of malt instead of corn syrup in wafer formulation and of in-package desiccants with adjuncts also extends shelf life. Chemical-physical measurements of changes taking place are being made on duplicates of the samples evaluated by the taste panel to find a test that will correlate with organoleptic evaluations, but as yet no meaningful correlations have been found. (Author)

AD-627 010 Fld. 6/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
INFLUENCE OF VARIOUS ADDITIVES ON MOISTURE EQUILIBRIUM OF BREAD,
by P. Ya. Mazur, and M. D. Fedorova. Dec 65, 8p. Rept. no. FSTC-381-T65-647
TT 66-60352

Unclassified report

Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Pishchevaya Tekhnologiya (USSR) n4 (47) p57-9 1965.

Descriptors: (*Bread, Moisture), Additives, Fats, Carbohydrates, Flour, Equilibrium, Mathematical analysis, USSR

AD-627 091 Fld. 6/8
CFSTI Prices: HC $4.00 MF $0.75
PILLSBURY MILLS INC MINNEAPOLIS MINN
FOOD ADJUNCTS STABILIZED AS THIN SHEETS OR LAMINATES.
Final rept. 15 Oct 62-15 Oct 64,
by Jack R. Durst. Sep 65, 120p. Contract DA-19-129-AMC-1 (N) Proj. PR63-724NR-RDT and E-327-K
FD 29

Unclassified report

Descriptors: (*Dehydrated foods, Laminates), Food, Sheets, Military rations, Acceptability, Storage, Packaging, Processing, Preparation, Condiments, Compressive properties, Odors, Taste

The report consists of two phases, each covering a period of 12 months. Phase I involves the development of 30 different prototypes of food sheets, either homogenous or laminates, incorporating common food products. When consumed in an appropriate food context, each sheet shall closely simulate the flavor of its respective adjunct in standard form, and shall not possess properties which will add significantly to the difficulty of mastication or swallowing. Phase II reports on storage stability tests of the above food sheets. A mixed sample phase of the storage study was also conducted to determine if different types of food sheets could be packaged together successfully. Representative samples from three different types of food sheets were packaged in a foil pouch. The three types were: (1) those incorporated into a stable dispersion; (2) those using a hydrocolloid as the structural matrix; and (3) those using a dry mixing technique incorporating a high melting fat as the structural matrix. Samples were placed in 40F, 73F, 100F, and cycling storage (40 to 0F). They remained in storage for two, four, eight and thirteen weeks. Results seem to indicate that different kinds of sheets could be successfully packaged together and stored if discretion were used in the selection of flavors. (Author)

AD-626 658 See Fld. 6/14

AD-626 789 See Fld. 7/1

AD-626 792 See Fld. 7/3

6/11. LIFE SUPPORT

AD-627 036 Fld. 6/11, 13/2
CFSTI Prices: HC $3.00 MF $0.50
SANITARY ENGINEERING RESEARCH LAB UNIV OF CALIFORNIA BERKELEY

A STUDY OF FUNDAMENTAL FACTORS PERTINENT TO MICROBIOLOGICAL WASTE CONVERSION IN CONTROL OF ISOLATED ENVIRONMENTS.
Quarterly rept. no. 8, Feb 64-Feb 65,
by Clarence G. Golueke, William J. Oswald, and Henry K. Gee. 31 Mar 65, 54p. Rept. no. Scientific-2 ,SERL-65-14
Contract AF19 (628)-2462 Proj. AF-8659 Task 865903
AFCRL 65-496
Unclassified report

See also AD-604 882.

Descriptors: (*Life support, Wastes (Sanitary engineering)), (*Wastes (Sanitary engineering), Closed ecological systems), (*Algae, Photosensitivity (Biological)), (*Space biology, Wastes (Sanitary engineering)), Microbiology, Regeneration, Water, Recovery, Culture media, Stabilization, Nutrition, Degradation, Growth, Heat transfer, Energy conversion, Light, Intensity, Solids, Oxidation, Oxygen, Carbon dioxide, Refrigeration systems, Odors, Sewage

The report describes experiments with an algatron system (i.e., one that involves the use of a mechanically rotated culture) and presents a design of a system to support two men. An average algae yield of 1500 mg/l/day was obtained at inner and outer light intensities of 225 and 270 ft-c, respectively, the maximum light intensities obtainable with the available light source. From 87 to 91% of incoming volatile solids were stabilized at detention periods from 0.25 to 1 day. No relation was noted between detention period and removal of P, Mg, Ca, and N. Low temperature distilled water yield was 1.83 ml/sq m/min (ambient relative humidity, 80%). Water losses from an algal culture and from a carbon black suspension were closely similar; and that from both, about 5% greater than from water alone. Design estimates based on the experimental conditions indicate that a maximum of 11 algatrons, each 18 in. in diameter and 4 ft long would be required per man for gas exchange, waste treatment, and water recovery (about 200 liters/day). (Author)

6/12. MEDICAL AND HOSPITAL EQUIPMENT AND SUPPLIES

AD-626 830 Fld. 6/12, 6/5
CFSTI Prices: HC $1.00 MF $0.50
AIR FORCE WEAPONS LAB KIRTLAND AFB N MEX
AN EVALUATION OF THE UNOPETTE METHOD OF BLOOD DILUTION FOR THROMBOCYTE COUNTS.
Rept. for Jun 63-Jun 65,
by Edward Ortega, and R. K. Jones. Jan 66, 16p.
Rept. no. AFWL-TR-65-114
Proj. 5710
Unclassified report

Descriptors: (*Blood platelets, Blood counts), Test methods, Pipettes, Determination, Errors, Laboratory equipment

A new method of blood dilution for the enumeration of thrombocytes has been compared with an older, conventional method of blood dilution. The new Unopette system produces lower but more consistent values than the conventional system. Fluctuation in the platelet level of any one sample over an 8-hour period was less marked for the Unopette method of blood dilution than with the standard method. It appears, therefore, that the Unopette system allows for an accurate and reproducible dilution technique. (Author)

AD-627 087 Fld. 6/12, 6/5, 11/9, 11/1
CFSTI Prices: HC $1.00 MF $0.50
ARMY MEDICAL BIOMECHANICAL RESEARCH LAB WALTER REED ARMY MEDICAL CENTER WASHINGTON D C
QUARTERLY PROGRESS REPORT, OCTOBER-DECEMBER 1965.
Dec 65, 11p.
Unclassified report

Descriptors: (*Prosthetics, Medical equipment), (*Medical equipment, Prosthetics), Adhesives, Tissues (Biology), Polymers, Acrylic resins, Laminates, Implants, Piperidines, Surgical techniques, Surgical supplies, Wound + injuries, Healing, Toxicity, Burns, Artificial limbs, Hands, Eye, Exercise, Dentistry, Urinary system

Contents: Adhesive, tissue; Arch support, Arterial grafts; Biomedical electronics; Bracing, lower extremity; Externally powered prosthesis; Exercise unit, constant torque; Hands, cam lock mechanism; Hand, resilient; Hook, FLAC: Implant materials; Optical insert, M17 CBR mask, type 3R1, long temporal struts; Optical insert, M14/M25, CBR mask, type 3R1, short temporal struts; Porous laminates; Urinary bladder reconstruction; Burn splint, soft foam; Foam-in-place splints; Dental forceps, Dentistry, postural demands; Hip prosthesis; Mouthsticks; Plastic cable transmission system; Prosthesis for immediate postoperative use; Retention catheters, acrylate; Small animal restraining cage; Surgical spray gun; Mechanical hands (Dorrance); Prescription clinic activities: Orthopedic; Facial and cosmetic. Publications; Staff activities; Personnel changes.

AD-627 211 Fld. 6/12, 6/5
CFSTI Prices: HC $1.00 MF $0.50
ARMY MEDICAL BIOMECHANICAL RESEARCH LAB WALTER REED ARMY MEDICAL CENTER WASHINGTON D C
EVALUATION OF RREP COSMETIC GLOVES.
Final rept.,
by John W. Hodge,Jr.. Nov 65, 11p. Rept. no. TR-6521
Proj. DA-3A025601A821-01
Unclassified report

Descriptors: (*Gloves, Prosthetics), (*Prosthetics, Gloves), Tensile properties, Thickness, Measurement, Hands, Quality control

Three cosmetic gloves fabricated from the RREP formulation were evaluated. This evaluation was conducted in an effort to determine the reasons for donning difficulties and unusually high cable forces on hands fitted with these gloves. The results indicate that the gloves are too small for the hands, and this factor contributes to the undesirable features observed. Finally, the wide range of thickness measurements indicate the need for closer quality control. (Author)

AD-627 212 Fld. 6/12, 6/3
CFSTI Prices: HC $1.00 MF $0.50
ARMY MEDICAL BIOMECHANICAL RESEARCH LAB WALTER REED ARMY MEDICAL CENTER WASHINGTON D C
ANIMAL RETENTION UNIT.
Final rept.,
by Carl A. Nielson. Dec 65, 21p. Rept. no. TR-6522
Proj. DA-3A025601A821-01
Unclassified report

Descriptors: (*Germ-free animals, Laboratory equipment), (*Laboratory equipment, Germ-free animals), Laboratory animals, Food, Construction, Mechanical drawings

Materials and methods are reported for the construction of a steam sterilizable apparatus for retaining germfree animals while nursing by conventional means. (Author)

AD-627 210 **See Fld. 7/3**

6/13. MICROBIOLOGY

AD-626 919 Fld. 6/13
BOOZ-ALLEN APPLIED RESEARCH INC BETHESDA MD
INDEPENDENT-ACTION AND BIRTH-DEATH MODELS IN EXPERIMENTAL MICROBIOLOGY,
by George Shortley, and Judd R. Wilkins. 1965, 41p.
Unclassified report

Availability: Bacteriological Reviews, v29 n1 p102-41 Mar 1965. Copies to DDC users only.

Descriptors: (*Microbiology, Diseases), (*Diseases, Mathematical models), Infections, Viruses, Bacteria, Experimental data, Time studies, Mortality rates, Resistance (Biological), Dosage, Microorganisms, Functional analysis, Probability, Statistical data, Mathematical prediction, Tables

The simple-exponential response-probability function that follows from the independent-action assumption when hosts are homogeneous and receive identical treatment is discussed. Host heterogeneity was identified by plotting response percentages on a so-called Weibull scale. A representative group of experimental data was analyzed by the Weibull procedure, and effects of host age, host strain, and route of inoculation or response probabilities were examined. It was concluded that the Weibull analysis of biological-response data is much more meaningful than the more common probit analysis, and will in many cases serve to divide the hosts into susceptible and resistant groups and give separate ID 50 values for these groups. It is recommended that the Weibull type of analysis of response probabilities be more widely used.

AD-627 188 Fld. 6/13
CFSTI Prices: HC $1.00 MF $0.50
CORNELL UNIV NEW YORK MEDICAL COLL
THE EFFECT OF HYPERBARIC OXYGEN ON MICROORGANISMS IN VITRO AND IN VIVO.
Final rept.
1966, 13p. Contract USPHS-PH-86-62-170
Unclassified report

Descriptors: (*Oxygen, Microorganisms), (*Microorganisms, Oxygen), (*Infections, Therapy), Mice, In vitro analysis, In vivo analysis, Mortality rates, Culture media, Pressure, Clostridium perfringens, Clostridium tetani, Escherichia coli, Aerobacter aerogenes, Pseudomonas aeroginosa, Salmonella, Proteus, Diplococcus pneumoniae, Staphylococcus aureus, Streptococcus pyogenes

The studies indicate that oxygen is effective in killing C. perfringens and C. tetani in vitro. However, oxygen under pressure (at 30 p.s.i.a.) is no more bactericidal than air at atmospheric pressure (15 p.s.i.a.). Furthermore, blood and muscle markedly inhibit the anticlostridial effect of oxygen. Protection of mice against death from infection with C. perfringens can be demonstrated only if the model is carefully chosen. Oxygen will not protect mice infected by intramuscular injection in normal muscle of C. perfringens, C. perfringens with calcium chloride, or C. perfringens with infusorial earth. Nor was protection observed when mice were infected by intramuscular injection of C. perfringens or C. perfringens with calcium chloride into crushed muscle. Protection by oxygen was observed only when mice were infected by injection of C. perfringens with infusorial earth into crushed muscle. Oxygen at 30 p.s.i.a. was inhibitory for some aerobic bacteria including strains of S. typhimurium, D. pneumoniae and S. aureus. However, mortality rates were not altered by exposure of mice to oxygen at 45 p.s.i.a. following intravenous injection of S. typhimurium, D. pneumoniae or S. aureus. Whereas no protection was afforded by oxygen therapy, it is also of significance that no increase in mortality from infection occurred in mice exposed to oxygen. (Author)

AD-627 191 Fld. 6/13
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF NUTRITION AND FOOD SCIENCE
EFFECT OF AFLATOXIN B1 ON CELL CULTURES,
by J. Gabliks, W. Schaeffer, L. Friedman, and G. Wogan. 13 May 65, 5p. Contract DA-49-193-MD-2533 ,PHS-CA06988-01
Unclassified report

Availability: Published in Journal of Bacteriology v90 n3 p720-3 Sep 1965. Copies to DDC users only.

Descriptors: (*Tissue culture cells, Toxins + antitoxins), (*Molds (Organisms), Toxins + antitoxins), Growth, Inhibition, Mitosis, Embryonated egg technique, Liver, Chickens, Toxicity, Embryos, Desoxyribonucleic acids, Ribonucleic acids, Proteins, Humans

Aflatoxin B1, a metabolite of the mold Aspergillus flavus, is toxic to cell cultures. The toxic effect is evidenced by an inhibition of growth followed by progressive granulation, rounding, and finally sloughing of the cells from the glass. In studies with embryonated eggs, duck embryos were found to be four to five times more susceptible than chick embryos. In studies on Chang liver cultures, there were decreases in cell number, protein, ribonucleic acid (RNA), and deoxyribonucleic acid (DNA) per culture with increasing aflatoxin B1 concentrations. Since the cell number decreased and the protein, RNA, and DNA content per cell increased with increasing concentrations of aflatoxin, enlarged cells were suggested. These data are consistent with in vivo data of other workers who have found hypertrophic cells with enlarged nuclei in histological studies on the tissues of rats and ducklings fed toxic peanut meal. (Author)

AD-627 050 **See Fld. 6/5**

AD-627 195 **See Fld. 6/6**

6/14. PERSONNEL SELECTION AND MAINTENANCE (MEDICAL)

AD-626 658 Fld. 6/14, 6/16, 6/8
CFSTI Prices: HC $3.00 MF $0.75
RAND CORP SANTA MONICA CALIF
A DOCUMENTARY ON WEIGHT, DIET AND EXERCISE,
by R. C. Drebelbis. Jan 66, 81p. Rept. no. P-3196
Unclassified report

Descriptors: (*Body weight, Determination), (*Diet, Physiology), (*Exercise, Physiology), Physical fitness, Weight

The paper presents authentic scientific data on correct weight, diet and exercise as essential to physical fitness and general good health. It contains a chart to determine metabolism or the calories per day that are required to lose weight and then to maintain a desired level. A complete nutritive calorie chart of foods arranged in alphabetical order is included. There is also a conversion table which relates weights and measurements to standard food portions in daily use. The document is organized into two parts: Part I deals with weight and diet and Part II discusses exercise and physical fitness. Part II also includes a series of Back Flexion Exercises recommended for individuals who suffer recurring back problems.

6/15. PHARMACOLOGY

AD-627 012 Fld. 6/15
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA
COMPUTER LIBRARY LITERATURE REVIEW ON EFFECTIVENESS OF ANTIMOTION SICKNESS DRUGS,
by Charles D. Wood, Robert S. Kennedy, Ashton Graybiel, Robert J. Wherry Jr., and Richard Trumbull. 15 Nov 65, 20p. Rept. no. NAMI-949 NAVMED MR005.13-6001.1-124
Unclassified report

Descriptors: (*Antimotion sickness agents, Effectiveness), Motion sickness, Pharmacology, Therapy, Antihistaminics, Belladonna alkaloids, Phenothiazines, Computers, Libraries, Reviews, United States, Great Britain

A computer library of the antimotion sickness drug literature has been established at the Naval Aerospace Medical Institute. A review of this literature is reported here. The over-all effectiveness of the antihistamines was 70.6 per cent; for the belladonnas it was 50.1 per cent, and for the phenothiazines it was 44.9 per cent. The over-all results of British studies indicated a greater effectiveness for the belladonnas than for the antihistamines, the reverse of U. S. studies. The effectiveness of the individual drugs against motion sickness is also reported. The over-all effectiveness of the drugs is compared in sea, air, and experimental motion studies. (Author)

AD-626 660 **See Fld. 6/16**

AD-626 874 **See Fld. 6/3**

AD-627 186 **See Fld. 6/16**

6/16. PHYSIOLOGY

AD-626 660 Fld. 6/16, 6/15
CFSTI Prices: HC $3.00 MF $0.75
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
THE ADRENERGIC INNERVATION OF THE VAS DEFERENS AND THE ACCESSORY MALE GENITAL GLANDS,
by Nils O. Sjorstrand. 1965, 81p. Contract AF-EOAR-52-65 Proj. AF-9777 Task 977701 AFOSR 65-1919
Unclassified report

Acta Physiol Scand v65 Suppl257 p1-82 1965.

Descriptors: (*Reproductive system, Males), (*Autonomic nervous system, Reproductive system), Testes, Prostate gland, Nerves, Nerve cells, Sympatholytic agents, Ganglia, Stimulation, Amines, Epinephrine, Levarterenol, Chemoreceptors, Motor reactions, Mammals, Guinea pigs, Humans, Sweden

The adrenergic innervation of the vas deferens and the accessory male glands of some mammals, and the presence of adrenaline and chromaffin cells in these organs were investigated. The results are presented in 3 sections: (1) the effect of ganglionic blocking agents on the motor response of the isolated guinea-pig vas deferens to hypogastric nerve stimulation; (2) the catecholamine content of the accessory male genital organs of different species and the effect of sympathetic denervation upon this content; and (3) the cellular localization of the catecholamines. From the results it is concluded that: (1) The vas deferens and the accessory male genital glands of the examined species in contrast to the general pattern of adrenergic innervation in mammals - are innervated by short adrenergic neurons and have an exceptionally rich adrenergic innervation, and (2) Adrenaline in the internal male genital organs is mainly stored in chromaffin cells. (Author)

AD-626 773 Fld. 6/16
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF RADIO AND ELECTRICAL ENGINEERING
THE INFERNAL TORSO,
by O. Z. Roy. 1965, 2p. Rept. no. NRC-8676
Unclassified report

Availability: Published in The American Journal of Cardiology v16 n4 p614 Oct 1965. Copies to DDC users only.

Descriptors: (*Cardiovascular system, Reviews), Canada, Medical research, Electrocardiography

The mathemetician or physicist to whom the bewildering empiricism of medicine has been revealed, ends his search for the Holy Grail. After formulating equations for every part of the anatomy and proving beyond doubt that the circulatory system is not unlike a sewage disposal network, he then applies all his resources to the mysterious signals generated by the heart. Voltage is a vector. With that as a foundation he proceeds to build a beautiful structure whose mortar is Green's, Gauss's, Helmholtz, Maxwell and other unrelated theorems. The literature to date, which could stock a good-sized city library, has shown that the spherical and semispherical heart have been well diagnosed and that neither of these would ever go undetected provided they were at the center of a spherical container filled, of course, with tap water. There does seem to be a dearth of diagnostic equations for the rectangular, conic and triangular hearts. Once his bountiful store of mathematical recipes has been exhausted, he puts his formulas to the acid test--the torso. When the measurements of the torso model and the theory coincide, and after showing that all discrepancies are obviously a result of boundary conditions, these dedicated analysts now share their timeless knowledge with the eagerly awaiting cardiologist, who would certainly apply this obviously superior approach if only Einthoven hadn't explained it all so well. (Extracted)

AD-626 837 Fld. 6/16
CFSTI Prices: HC $1.00 MF $0.50
CHICAGO MEDICAL SCHOOL ILL DEPT OF ANATOMY
OBSERVATIONS ON KIDNEYS OF DESERT AND SWAMP ANIMALS. I. PLASMA AND URINE OSMOLALITY IN SOME DESERT AND SWAMPDWELLING MAMMALS,
by George C. Dewey, Hans Elias, Peter M. Elias, and David C. Bagley. 1964, 13p. Contract DA-49-193-md-2270 ,PHS-H-4216
Unclassified report

Descriptors: (*Kidneys, Adaptation (Physiology)), (*Acclimatization, Physiology), Blood plasma, Osmosis, Mammals, Tolerances (Physiology), Water, Environment, Deserts, Swamps, Climatology, Rabbits

Urine and plasma osmolalities were determined by cryoscopy in deermice (Peromyscus) and rabbits (Sylvilagus) from arid and humid environments. Rabbits in 'wet' environmental cages produced urine of 390 to 1200 milliosmoles/liter. Those deprived of water produced urine of 800 to 1250 milliosmoles/liter, and those given ADH in addition produced urine of 1300 and 1500 milliosmoles/liter. Desert cottontails during the dryest season produced urine of 1100 to 2450 milliosmoles/liter. Plasma osmolalities in all rabbits ranged from 300 to 430 milliosmoles/liter with only two cases in eleven exceeding 350 milliosmoles/liter. Dry season desert deermice showed plasma osmolalities from 500 to 900 milliosmoles/liter while those examined during the relatively moist season showed plasma osmolalities from 375 to 420 milliosmoles/liter. Dry season urine ranged from 1250 to 4400 milliosmoles/liter while moist season urine ranged from 2435 to 4170 milliosmoles/liter. In desert deermice an important method of adjustment to aridity, aside from the production of highly concentrated urine, appears to be the ability to vary plasma osmolality and to tolerate a highly concentrated plasma osmolality. Plasma osmolalities in deermice from cool, wet environments ranged from 250 to 440 milliosmoles/liter while urine ranged from 550 to 3100 milliosmoles/liter. (Author)

AD-626 838 Fld. 6/16
CFSTI Prices: HC $1.00 MF $0.50
CHICAGO MEDICAL SCHOOL ILL DEPT OF ANATOMY
OBSERVATIONS ON KIDNEYS OF DESERT AND SWAMP ANIMALS. II. STEREOLOGY OF THE RENAL CORPUSCLES OF DESERT AND SWAMP DEERMICE,
by George C. Dewey, Hans Elias, and Kipley-Rae Appel. 1965, 14p. Contract DA-49-193-md-2270 ,PHS-H-4216

Unclassified report

Descriptors: (*Kidneys, Adaptation (Physiology)), (*Acclimatization, Physiology), Deserts, Swamps, Environment, Mammals, Mice, Histology, Volume, Density, Blood, Water, Mathematical analysis

The renal corpuscles of desert deermice and swamp deermice were investigated for quantitative differences in structure by statistico-geometrical (stereological) methods. There was found to be essentially no difference between the two groups in mean glomerular size. Blood channel length per unit glomerular volume in swamp mice was found to be 1.09 times that of desert mice. Filtration surface area per unit glomerular volume in swamp mice was found to be 1.25 times that of the desert mice. However, these relatively small differences between individual glomeruli were greatly magnified by a 1.6-fold difference in the number of glomeruli per kidney in swamp mice (13,700) over desert mice (8,600). As a result, the blood channel length per kidney in swamp mice (23 meters) was 1.77 times that in desert mice (13 meters), and filtration surface area per kidney in swamp mice (430 mm sq.) was found to be 2.05 times that of desert mice (210 mm sq.). (Author)

AD-626 840 Fld. 6/16
CFSTI Prices: HC $1.00 MF $0.50
CHICAGO MEDICAL SCHOOL ILL
SCIENTIFIC TERMINAL REPORT,
by Hans Elias. 1965, 3p. Contract DA-49-193-MD-2270

Unclassified report

Descriptors: (*Kidneys, Adaptation (Physiology)), (*Adaptation (Physiology), Climatology), (*Acclimatization, Physiology), Deserts, Swamps, Mammals, Environment, Urine, Tolerances (Physiology)

Conclusions: Desert and swamp deermice produce highly concentrated urine. Desert deermice have the additional adaptive power of tolerating an unusually high plasma concentration. Rabbits (desert cottontails as well as marsh rabbits) maintain a fairly constant osmolality of the internal medium. The ability to concentrate urine is great even in marsh rabbits when they are exposed to aridity of the environment. This concentrating ability of the marsh rabbits is enhanced, when exogenous ADH is injected. The size range of glomeruli is the same for desert and swamp deermice. But swamp deermice possess about twice as many glomeruli. The total length of glomerular blood channels is 23 m for swamp deermice, but only 13 m for desert deermice. The total glomerular filtration area is 430 mm sq for swamp deermice, but only 210 mm sq for desert deermice. The spaces of Bowman's capsule are 3 times as voluminous in desert mice than in deermice. If these measurements could be continued to encompass all parts of the nephron of the collecting tubules and of the interstitium, great progress could be achieved in the understanding of the role which every part of the kidney plays in the concentrating mechanism.

AD-627 110 Fld. 6/16
ARMY NATICK LABS MASS
THE EFFECT OF PROLONGED COLD AND STARVATION AND SUBSEQUENT REFEEDING ON PLASMA LIPIDSS AND GLUCOSE OF NORMAL MEN,
by Milton Mager, and P. F. Iampietro. 2 Sep 65, 8p.

Unclassified report

Availability: Published in Metabolism v15 n1 p9-16, 1966. Copies to DDC users only.

Descriptors: (*Obesity, Starvation), (*Starvation, Lipids), (*Lipids, Metabolism), Cold weather tests, Exposure, Diet, Cholesterol, Glucose, Phospholipids, Fatty acids, Nutrition, Stress (Physiology)

Six healthy young men served as test subjects in a 6-week study which consisted of a 2-week control period, a 2-week starvation-plus-cold period, and a 2-week period of refeeding with restricted diets. Plasma glucose levels declined to 20 per cent below control values within 2 days of cold and starvation, and remained there thereafter. Restoration to control levels was achieved during the first day of refeeding. Plasma cholesterol, phospholipids and total lipids increased during the early phases of cold and starvation, and were restored to control values by the end of the fourteenth day. Plasma free fatty acids (FFA) rose to over 200 per cent of control levels within 2 days, and remained constant thereafter. With refeeding, plasma cholesterol, phospholipids and total lipids overshot to levels of 20-40 per cent of control values; whereas, FFA declined to nadir levels which averaged 32 per cent below control concentrations. The reciprocal changes in FFA and other lipids suggest that in man, as in experimental animals, exuberant lipogenesis may occur when refeeding is instituted following depletion of endogenous substrates. (Author)

AD-627 186 Fld. 6/16, 6/15
CFSTI PricesMF $1.25
ARMED FORCES-NRC COMMITTEE ON VISION WASHINGTON D C
RECENT DEVELOPMENTS IN VISION RESEARCH,
by Milton A. Whitcomb. 1966, 228p.
NAS-NRC 1272

Unclassified report

Availability: Printing and Publishing Office, National Academy of Sciences, National Research Council, Washington, D. C. 20418. HC $4.00, CFSTI MF $1.25.

Descriptors: (*Vision, Medical research), Physiology, Reflexes, Eye, Humans, Animals, Light, Vestibular apparatus, Nystagmus, Psychophysiology, Retina, Neurology, Muscles, Drugs, Electrophysiology

Contents: Physiological reflex mechanisms in vision: Focusing responses of the human eye: Pupillary movements associated with light and near vision: The fusion reflex: Vestibular mechanisms and vision. Instrumentation and procedures in vision research: Visual psychophysics with animals: Measurements of light reflected from the retina: Stabilized image techniques: Principles of neurological feedback control systems for eye muscles. Effects of drugs on vision: Ocular pharmacodynamics: Sensory effects of drugs: electrophysiological investigations of the mechanism of the action of drugs on the eye: Pharmacology of extraocular muscles: Drug and eye movement responses in man: Effects of drugs on vision: Potential of research on drugs and vision.

AD-627 236 Fld. 6/16
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
CONTRADICTIONS OF VISION,
by R. Podolnyi. Dec 65, 12p. Rept. no. FSTC-381-T65-615
TT 66-60389

Unclassified report

Trans. of Zanie-Sila (USSR) v40 n8 p34-7 1965.

Descriptors: (*Color vision, Biophysics), Visual perception, Spectra (Visible + ultraviolet), Visual acuity, Retina, Nerve fibers, Electrophysiology, Adaptation (Physiology), Test methods, Amphibians, Humans, USSR

AD-626 658 **See Fld. 6/14**

6/17. PROTECTIVE EQUIPMENT

AD-627 107 Fld. 6/17, 6/19
ARMY RESEARCH INST OF ENVIRONMENTAL MEDICINE NATICK MASS
LOCAL HEAT TRANSFER COEFFICIENTS OF LABORATORY FACIAL PROTECTIVE SYSTEMS IN WIND.
by George F. Fonseca, and Alan H. Woodcock. 10 Jun 65, 5p.

Unclassified report

Availability: Published in Textile Research Journal v35 n10 p909-13 Oct 1965. Copies to DDC users only.

Descriptors: (*Face, Protective clothing), (*Protective clothing, Heat transfer coefficients), Wind, Cylindrical bodies, Cooling, Cold weather tests, Frostbite

The paper describes a laboratory experiment which determined the local heat transfer coefficients from a nonuniformly insulated cylinder in wind. Application of these data to the problem of facial cooling in wind is discussed. It is shown that the quantitative data obtained are comparable to the beliefs based on qualitative human experience. (Author)

AD-627 190 Fld. 6/17
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
EFFICACY OF PRESSURE SUIT COOLING SYSTEMS IN HOT ENVIRONMENTS.
Final rept. for Jul-Dec 64,
by James H. Veghte. Oct 65, 9p. Rept. no. AMRL-TR-65-58
Proj. AF-7164 Task 716409

Unclassified report

Availability: Published in Aerospace Medicine v36 n10 p965-7 Oct 1965. Copies to DDC users only.

Descriptors: (*Pressure suits, Cooling), Heat tolerance, Thermal stresses, Ventilation, Water, Air, Cooling + ventilating equipment, Evaporation, Environment

Three different air distributing systems and one water-cooled system were evaluated for efficacy in cooling a person in a full pressure suit. Five subjects participated in experiments at atmospheric pressure in a 43C environment. The pressure suit was worn unpressurized and pressurized at 192 mm Hg. The results show the separate tubular air ventilating garment to be equal to or superior in evaporative cooling efficiency to either an extremity distributing system which is an integral part of the current operational full pressure suit, or to the standard Air Force ventilating garment. The water-cooled system was superior to all air distribution systems and the subjects were comfortable for the entire two-hour test period. In control experiments with no ventilation, tolerance limits were reached before the end of two hours. On the basis of these data, serious consideration of water-cooled suit systems for maintaining a person in thermal comfort under conditions of thermal stress should be continued. (Author)

AD-626 979 **See Fld. 6/19**

6/18. RADIOBIOLOGY

AD-626 682 Fld. 6/18, 6/5
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF

BONE MARROW AS THE MAJOR SOURCE OF POTENTIAL IMMUNOLOGICALLY COMPETENT CELLS IN THE ADULT MOUSE,
by Marvin L. Tyan, and Leonard J. Cole. 8 Dec 65, 12p. Rept. no. USNRDL-TR-946
NAVMED MR005.08-1200-2
Unclassified report

Descriptors: (*Immunology, Bone marrow), (*Bone marrow, Transplantation), (*Transplantation, Radiation effects), (*Radiation effects, Immunity), Tissue extracts, Sublethal dosage, Lymphatic system, Spleen, Cells (Biology), Thymus, Injection (Medicine), Hemopoietic system, X rays, Mice

Groups of F1 hybrid mice (A x B) were sublethally irradiated and injected with cells from various lymphoid tissues of adult parental strain (A) mice. Spleen and lymph node cells and cells from the thymus of the survivors were then injected into an F1 hybrid of another type (A x C). A significant number of deaths occurred among the secondary hosts only when they had received spleen cells from mice which had been injected with adult bone-marrow cells. (Author)

AD-626 996 Fld. 6/18
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
TIME HISTORY OF BIOLOGICAL RESPONSE TO IONIZING RADIATION,
by Endel Laumets. 22 Nov 65, 46p. Rept. no. USNRDL-TR-905
Proj. SF-011-05-12 Task 0506
Unclassified report

Descriptors: (*Radiation hazards, Military personnel), (*Radiation injuries, Casualties), (*Whole body irradiation, Mathematical analysis), Nuclear explosions, Radiation tolerance, Radiation sickness, Radiation effects, Radiological dosage, Radiotherapy, Convalescence, Dose rate, Nuclear warfare casualties, Mortality rates, Tables, Japan

Exposure of personnel to initial ionizing radiation from a nuclear air or surface burst can cause both prompt and delayed casualties. Their percentages and times to incapacitation (or combat ineffectiveness, in a military sense) after exposure can be of major significance in military operations. Although adequate data are lacking for the determination of dose-effect relationships vs time after exposure, quantitative estimates are needed nevertheless for guidance in battlefield predictions and decision-making. Available nuclear-accident data and other data on human exposures are used to obtain curves to represent the estimated time history of the acute radiation syndrome as a function of dose received in a very short time. The sources of data are clinical records of nuclearaccident casualties from 1945 to 1958, followup records of radiotherapy patients, and casualty studies on the atomic explosions at Hiroshima and Nagasaki. Emphasis is put on the time after exposure of the onset of the initial stage of radiation sickness (nausea, vomiting, malaise, etc.), duration of the initial stage, start and duration of the following asymptomatic latent period, time of onset of the second (or manifest illness) stage, and time of eventual recuperation or death. The estimated time history is depicted graphically with two other time histories for comparison. Analytical expressions are derived for the three time histories for use in estimating any of these syndrome times or periods. (Author)

AD-626 997 Fld. 6/18
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
LONGEVITY IN NEUTRON-EXPOSED GUINEA PIGS,
by Donald J. Kimeldorf, Richard D. Phillips, and Dave C. Jones. 3 Dec 65, 20p. Rept. no. USNRDL-TR-941
NAVMED MR-005.08-5201-2
Unclassified report

Descriptors: (*Whole body irradiation, Life span), (*Life span, Whole body irradiation), (*Radiation effects, Guinea pigs), Lethal dosage, Sublethal dosage, Survival, Mortality rates, Fast neutrons, Germ-free animals, Analysis of variance

Life span data has been accumulated for male guinea pigs from a specific pathogen free Hartley strain colony, maintained on a vitamin C supplemented diet. Observations were made on 25 sham-irradiated controls and 78 animals exposed as young adults to a simulated fission energy spectrum of neutrons obtained by the bombardment of a thick beryllium target with 12 Mev protons. The neutron-exposed groups included 18 animals subjected to a high sublethal dose (100 rads, first collision dose), and 60 animals which were the 30-day survivors of 120-160 rad doses. Approximately 11 to 72% of the animals died during the first 30 days after 120-160 rads. It was found that the median age at death for the sham-exposed controls was 828 days. The median age at death was 730 days for animals exposed to the sublethal dose and 698 days for the survivors of the 30-day lethal dose range. Both median life span values are significantly ($p < 0.01$, analysis of variance) smaller than that for controls. The observations in the guinea pig regarding a reduction in life span after a single total-body exposure to neutrons, corroborate in an additional species, the conclusions previously based solely on studies of rats and mice. (Author)

AD-627 069 Fld. 6/18
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
EFFECT OF IONIZING RADIATION ON THE HEART; REACTION OF THE HEART IN NORMAL CONDITIONS TO RADIATION,
by S. G. Antonyan. 20 Dec 65, 22p. Rept. no. FTD-TT-65-1082
TT 65-60359
Unclassified report

Unedited rough draft trans. of Akademiya Nauk Armyanskoi SSR, Erevan. Izvestiya. Biologicheskie Nauki v17 n7 p45-54 1964.

Descriptors: (*Heart, Radiation effects), (*Radiation effects, Heart), Reviews, Cardiovascular system, Radiological dosage, X rays, Gamma rays, Radiation injuries, Radiation sickness, Autonomic nervous system, Hemorrhage, Necrosis, Pathology, Electrocardiography, Histology, Metabolism, Electrophysiology, Morphology (Biology), Epinephrine, Acetycholine

AD-626 998 See Fld. 18/4

AD-627 014 See Fld. 18/8

6/19. STRESS PHYSIOLOGY

AD-626 979 Fld. 6/19, 6/17, 22/1, 3/2
CFSTI Prices: HC $3.00 MF $0.75
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
MOBILITY OF PRESSURE-SUITED SUBJECTS UNDER WEIGHTLESS AND LUNAR GRAVITY CONDITIONS.
Final rept., Jun 61-Jun 62,
by John C. Simons, Dieter E. Walk, and Charles W.Sears. Aug 65, 96p. Rept. no. AMRL-TR-65-65
Proj. AF-7184 Task 718405 ,718408
Unclassified report

Descriptors: (*Weightlessness, Human engineering), (*Lunar environment, Performance (Human)), (*Pressure suits, Mobility), Simulation, Motion, Maneuverability, Gravity, Space flight, Body, Posture, Time studies, Astronauts, Hatches, Analysis of variance, Anthropometry, Graphics, Tables

Problems of moving through hatchways under zero and lunar gravity conditions, and related design problems of hatch size and shape, were investigated in flight. Subjects were timed and photographed as they accomplished various motions during weightless and lunar-gravity maneuvers of a large cabin aircraft. Performance data are presented for various combinations of clothing, gravity and body-position conditions. Time and contact data are presented for the egress motion as it is influenced by changes in the exit area. Orientation problems and maneuvering techniques, as influenced by area and volume restrictions, are discussed. Motions of pressure-suited subjects generally required 30% more time than corresponding motions of unsuited subjects. Most motions required 35% more time during zero G than during lunar G. No significant differences in egress times were found among four body-positions. Compared with 1 inch of exit clearance, 5 inches of clearance improved egress time by approximately 6%. Accuracy, rather than time of motion, appeared to be a more sensitive measure of operator performance for the egress task. A 95th percentile shoulder plane with a 19.4-inch major axis is proposed as a basic egress reference. (Author)

AD-627 044 Fld. 6/19, 5/9
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA
THE VALIDITY OF A BRIEF VESTIBULAR DISORIENTATION TEST IN SCREENING PILOT TRAINEES,
by Rosalie K. Ambler, and Fred E. Guedry Jr.. 18 Oct 65, 14p. Rept. no. NAMI-947
NAVMED MR005.13-6001.1-122
Unclassified report

Descriptors: (*Motion sickness, Pilots), (*Pilots, Selection), (*Aviation personnel, Training), Tests, Vestibular apparatus, Rotation, Head, Naval training, Statistical analysis, Tables

A Brief Vestibular Disorientation Test (BVDT) has been developed that involves an assessment of reactions produced by head movements in a rotating chair. Reliability of measurement has been demonstrated. This study investigated the validity of the test for predicting pilot training criteria. The BVDT was administered to 226 naval aviation trainees during the latter part of their pre-flight training. After the subjects had either completed training or separated therefrom, the test results were evaluated for their relation to the following criteria: (1) students separated from flight training for all causes vs. completions; (2) tension and/or airsick separations vs. all others; and (3) airsick separations vs. all others. Relationships existed between high sensitivity scores on the BVDT and membership in the various separation groups. The airsick separation group had the highest mean score. Evidence indicates that the BVDT ratings tap a significant portion of the flight criterion variance not reached by the present prediction methods. (Author)

AD-627 107 See Fld. 6/17

6/20. TOXICOLOGY

AD-627 093 Fld. 6/20, 6/3
CFSTI Prices: HC $3.00 MF $0.75
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
POISONOUS BITES,
by M. N. Sultanov. 14 Jan 66, 64p. Rept. no. FTD-TT-65-662
TT 66-60368
Unclassified report

Unedited rough draft trans. of mono. Yadovitye Ukusy, Moscow, 1964.

Descriptors: (*Bites + stings, Toxicity), (*Poisons, Bites + stings), Reptiles, Venoms, Ara-

chnids, Hymenoptera, Toxins + antitoxins, Immune serums, Detoxification, Central nervous system, Dosage, Morphology (Biology), Therapy, USSR

Contents: Poisonous snakes: Certain biological characteristics of snakes; Clinical phenomena after snakebite; Treatment of snakebite victims; Prevention of snakebite. Poisonous Arachnida: Painful sensations after the sting of a scorpion; Clinical phenomena after the bite of a karakurt; Is the bite of a tarantula dangerous. Hymenoptera: Clinical phenomena after a sting by wasps or bees; Treatment of stings of scorpions, karakurts, wasps and bees.

AD-627 194 **See Fld. 6/6**

AD-627 195 **See Fld. 6/6**

AD-627 199 **See Fld. 6/6**

Field 7-CHEMISTRY

7/1. CHEMICAL ENGINEERING

AD-626 789 Fld. 7/1, 6/8
CFSTI Prices: HC $2.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
NINTH MENDELEYEV CONFERENCE (ON GENERAL AND APPLIED CHEMISTRY),
by V. Azernikov. Dec 65, 29p. Rept. no. FSTC-381-T65-547
TT 66-60283

Unclassified report

Trans. of Nauka i Zhizn (USSR) v32 n8 p12-2 1965.

Descriptors: (*Chemistry, Symposia), (*Symposia, Chemistry), (*Food, Synthesis), USSR

The title paper is a summary of the conference. Also included is a translation of the semi-popular paper 'Synthetic Foodstuffs - A New Problem of Chemistry', by A. Nesmeyanov and V. Belikov. (Nauka i Zhizn v32, n8, p. 14-21, 1965).

AD-626 856 **See Fld. 21/2**

7/2. INORGANIC CHEMISTRY

AD-626 685 Fld. 7/2
CFSTI Prices: HC $1.00 MF $0.50
AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO
DETERMINATION OF FREE TUNGSTEN IN TUNGSTEN SILICIDE (WSI2).
Rept. for Feb-Jun 65,
by Ken F. Sugawara. Aug 65, 23p. Rept. no. AFML-TR-65-248
Proj. AF-7360 Task 736005

Unclassified report

Descriptors: (*Tungsten, Quantitative analysis), (*Tungsten compounds, Silicides), Hydrogen peroxide, Molybdates, Chemical analysis, Silicon, Powders, Single crystals, Recovery

The primary concern was to determine whether hydrogen peroxide solution (30%) could selectively and quantitatively separate free tungsten from WSi2. The recovery experiments proved that quantitative recoveries from spiked samples by the recommended procedure were possible. When hydrogen peroxide was placed in contact with tungsten silicide at 60 - 70C for 1 to 4 hr in order to study its reactance with the silicide, the results indicated that the concentration of tungsten in the extract attained a maximum value within one hour and remained essentially constant thereafter. The silicon content in the hydrogen peroxide fraction was determined experimentally by applying the spectrophotometric silico-molybdate (yellow) procedure. Since hydrogen peroxide seriously interfered in the method by intensifying the yellow color, a method was devised to eliminate this source of interference. If a material balance could be determined for each sample with sufficient accuracy and precision, important conclusions could be drawn with regard to the homogeneity of the sample as well as lend support to the validity of the method. The material balance study was greatly dependent upon the analysis of the WSi2 residue following the extraction of free tungsten with hydrogen peroxide.

AD-626 758 Fld. 7/2
CFSTI Prices: HC $2.00 MF $0.50
SHEFFIELD UNIV (ENGLAND)
STUDIES IN THE HALOGENATION OF ALIPHATIC COMPOUNDS.
Summary rept.,
by J. M. Tedder, I. Galiba, and H. Singh. Oct 65, 28p. Contract AF-EOARDC-61-7 Proj. AF-7342 Task 734201
ASD TR-63-155

Unclassified report

Descriptors: (*Aliphatic compounds, Halogenation), (*Alkanes, Chlorination), (*Halogenated hydrocarbons, Halogenation), (*Fatty acids, Halogenation), (*Carbon tetrachloride, Fluorination), (*Butanol, Chlorination), Reaction kinetics, Bromination, Butane, Acetates, Ethers, Chlorine compounds, Bromine compounds, Fluorine compounds, Great Britain

The relative rates of the gas phase chlorination of nhexane at the primary and secondary positions were studied and a rate expression obtained. The chlorination and bromination of 1,1,1-trifluoropentane and 1-fluorobutane were studied in the gas phase using a static system. The reactions were studied at several temperatures and approximate values of the Arrhenius parameters for attack at each site in the molecules were obtained. The results confirm earlier work and show that the CF3 group exerts a very powerful deactivating effect on halogenation at adjacent sites. The chlorination and bromination of n-valeryl fluoride chloride and methyl valerate were studied in the gas phase using a static system. The acyl group deactivates halogenation at adjacent methylene groups, but to a lesser extent at the alpha-position than would be expected on purely polar grounds. The gas phase reaction of fluorine and carbon tetrachloride with nitrogen as a diluent was studied in a flow system. The extent of reaction was followed by determining the halide formed when unchanged fluorine and any fluorine monochloride produced was converted into hydrogen fluoride and hydrogen chloride. (Author)

AD-626 805 Fld. 7/2, 21/9.2, 7/4
CFSTI Prices: HC $1.00 MF $0.50
AUBURN UNIV ALA
A STUDY OF THE DECOMPOSITION MECHANISM OF AMMONIUM PERCHLORATE.
Quarterly rept. no. 2, 1 Oct-31 Dec 65,
by James E. Land. 31 Dec 65, 11p. Contract DA-01-021-AMC-12346 (Z)

Unclassified report

Descriptors: (*Ammonium compounds, Perchlorates), (*Oxidizers, Decomposition), Differential thermal analysis, Catalysts, Oxides, Complex compounds, Ferrocenes, Additives

Efforts were concerned with: (a) a continuation of the making of DTA runs at various heating rates on ammonium perchlorate (AP) samples to which had been added various metal oxides to measure the catalytic effect of these additives; (b) performing DTA runs on AP samples to which had been added certain metal complexes of the ferrocene type, and (c) beginning a series of DTA runs on AP samples which have been doped with a known per cent of a metal perchlorate so as to determine the influence of this additive on the DTA exo- and endotherums recorded for AP decomposition as it is heated at various rates over a given temperature range. (Author)

AD-626 987 Fld. 7/2
CFSTI Prices: HC $2.00 MF $0.50
NUCLEAR METALS DIV TEXTRON INC WEST CONCORD MASS
PREPARATION OF STANDARD SAMPLES AND DEVELOPMENT OF ANALYTICAL TECHNIQUES FOR CARBON AND NITROGEN IN HIGH-PURITY BERYLLIUM.
Final rept.,
by L. R. Aronin, F. A. Bauman, and A. K. Wolff. Oct 65, 50p. Rept. no. NMI-9703.4
Contract AF33 (615)-1692 Proj. AF-7360 Task 736005
AFML TR-65-195

Unclassified report

Descriptors: (*Beryllium, Quantitative analysis), Chemical analysis, Determination, Distillation, Combustion, Beryllium alloys, Carbon, Nitrogen

Analytical techniques have been developed for the determination of carbon in high-purity beryllium. The method, a modification of the combustion-conductometric technique, permits an increase in the sample size of about four times, thereby achieving a fourfold reduction in the lower limit of useful analytical results. Sensitivity has been demonstrated for carbon contents as low as 25 ppm. The accuracy of a solution distillation technique for determination of nitrogen in high-purity beryllium has been established. A modified micro-Kjeldahl still was employed. Nitrogen contents less than 10 ppm can be accurately determined. Three batches of beryllium weighing roughly 5 pounds each have been prepared. Each batch was attritioned, sized and blended to provide a homogeneous material for analytical standards. These standards, in the form of coarse chips, have the following carbon and nitrogen contents for the 3 standards in parts per million, respectively: carbon, 25, 101, and 120 and nitrogen, 11, 55, and 56.

AD-627 024 Fld. 7/2, 7/5
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
QUANTITATIVE RADIOCHEMICAL DETERMINATION OF NICKEL-63 IN SEAWATER,
by Ming G. Lai, and Harry A. Goya. 3 Nov 65, 21p. Rept. no. USNRDL-TR-924
Contract AT (49-5)-2084

Unclassified report

Descriptors: (*Nickel, Quantitative analysis), Radioactive isotopes, Radiochemistry, Scintillation counters, Sea water, Solutions, Sulfuric acid, Chloroform, Nickel alloys, Corrosion

A liquid scintillation method for the quantitative determination of Ni63 in seawater is described. The method consists in complexing the nickel in seawater with dimethylglyoxime, extracting it into chloroform, and then back-extracting the nickel into an aqueous phase using dilute sulfuric acid. An aliquot of this sample is added to a scintillation solvent and counted in a liquid scintillation counter. (Author)

AD-627 060 Fld. 7/2, 11/9, 7/3
CFSTI Prices: HC $1.00 MF $0.50
PENNSALT CHEMICALS CORP WYNDMOOR PA RESEARCH AND DEVELOPMENT DEPT
COORDINATION POLYMERS WITH INORGANIC BACKBONES FORMED BY DOUBLE-BRIDGING OF TETRAHEDRAL ELEMENTS.
Technical rept.,
by B. P. Block, Selwyn H. Rose, C. W. Schaumann, E. S. Roth, and Joseph Simkin. Jul 62, 5p. Rept. no. TR-33
Contract Nonr-2687 (00) Proj. NR-356-408

Unclassified report

Descriptors: (*Inorganic polymers, Synthesis (Chemistry)), (*Phosphines, Inorganic polymers), Beryllium compounds, Chromium compounds, Zinc compounds, Polymerization, Molecular structure, Fibers (Synthetic)

Typical modes of preparation are reported for some novel polymeric metal phosphinates, among which are included /Be (OPPh2O)2/x, /Zn (OPPh2O)2/x, and /Zn (OP (Ph) (Me)O)2/x.

AD-627 106 Fld. 7/2
TORONTO UNIV (ONTARIO) DEPT OF METALLURGY AND MATERIALS SCIENCE
THE PREPARATION OF ANHYDROUS ZIRCONIUM DICHLORIDE.
by B. Swaroop, and S. N. Flengas. 16 Nov 64, 3p.

Unclassified report

Availability: Published in Canadian Journal of Chemistry v48 p2115-7 1965. Copies to DDC users only.

Descriptors: (*Zirconium compounds, Chlorides), (*Chlorides, Zirconium compounds), Synthesis (Chemistry), Test methods, Canada

The existence of zirconium dichloride was first noticed by de Boer and Fast (1) while zirconium tetrachloride was heated with zirconium metal in the presence of aluminium chloride. Later, Larsen and Leddy (2) and Turnbull and Watts (3) confirmed the formation of zirconium dichloride while studying the disproportionation of zirconium trichloride. However, the production of high purity, anhydrous zirconium dichloride was not achieved by these investigators. In the present investigation, zirconium dichloride of a purity between 95 and 99% was produced by the direct reaction between zirconium trichloride powder and zirconium metal. (Author)

AD-627 166 Fld. 7/2
CFSTI Prices: HC $1.00 MF $0.50
FELTMAN RESEARCH LABS PICATINNY ARSENAL DOVER N J
LUMINESCENT REDOX TITRATIONS. I. TITRATIONS WITH H202 SOLUTION.
Technical translation,
by Laszlo Erdei, and Lajos Buzas. Jan 66, 19p.
TT 66-60384,TT-4

Unclassified report

Trans. from paper, Meeting of the Hungarian Chemical Society, 22 Sep 53, n. p. n. d.

Descriptors: (*Volumetric analysis, Chemical indicators), (*Chemical indicators, Hydrogen peroxide), (*Hydrogen peroxide, Volumetric analysis), (*Chemiluminescence, Volumetric analysis), Oxidation-reduction reactions, Hypochlorites, Potassium compounds, Iron compounds, Cyanides, Arsenic compounds, Chromium, Ions, Hungary

It is possible to titrate, with a hydrogen peroxide solution in basic media and in the presence of lucigenin as indicator, hypohalites, potassium ferricyanide and arsenite ions, and indirectly Cr (III) ions. The end point of the titration is indicated by the chemiluminescence setting in as a result of excess H2O2. (Author)

AD-627 198 Fld. 7/2
BIRMINGHAM UNIV (ENGLAND) DEPT OF CHEMISTRY
PREPARATION OF THIAZYL FLUORIDES,
by B. Cohen, T. R. Hooper, D. Hugill, and R. D. Peacock. 1965, 4p. Contract AF-EOAR-96-63
Proj. AF-9710 Task 971002
AFOSR 65-2184

Unclassified report

Availability: Published in Nature v207 n4998 p748-9 Aug 1965. Copies to DDC users only.

Descriptors: (*Sulfur compounds, Synthesis (Chemistry)), (*Nitrogen compounds, Synthesis (Chemistry)), (*Fluorides, Synthesis (Chemistry)), Thiazoles, Nitrides, Selenium compounds, Iodine compounds, Antimony compounds, Vanadium compounds, Ammonia, Chemical reactions, Great Britain

Observations were made of the action of several liquid and gaseous fluorides on sulphur nitride, and also the reaction of sulphur tetrafluoride with ammonia. The fluorides examined were: selenium tetrafluoride, iodine pentafluoride, sulphur tetrafluoride, antimony pentafluoride, and vanadium pentafluoride. The temperatures at which the reactions occur and the products formed (particularly thiazyl fluoride) are given. It is noted that sulphur tetrafluoride reacts with ammonia at -95C to yield sulphur tetranitride and at 25C to yield thiazyl fluoride. (Author)

AD-627 221 Fld. 7/2, 7/4, 7/3
CFSTI Prices: HC $5.00 MF $1.00
IOWA STATE UNIV OF SCIENCE AND TECH AMES
RARE EARTH RESEARCH CONFERENCE (5TH), AUGUST 30, 31, SEPTEMBER 1, 1965, BOOK ONE. SPECTRA SYMPOSIUM SESSION S-1 AND SPECTRA SESSION S-2.
1965, 158p. Contract AF-AFOSR-812-65
AFOSR 65-1917-Bk-1

Unclassified report

See also AD-627 222.

Descriptors: (*Rare earth elements, Symposia), (*Symposia, Rare earth elements), (*Spectroscopy, Rare earth compounds), Chemical bonds, Electron transition, Fluorescence, Europium compounds, Terbium compounds, Chelate compounds, Chemical equilibrium, Lasers, Oxides, Phosphorescent materials, Crystal lattices, Neodymium compounds, Samarium compounds, Dysprosium compounds, Chlorides, Monocylic compounds, Yttrium compounds, Cerium, Lanthanum compounds, Fluorides, Acetic acids

Contents: orbital energy differences and chemical bonding in rare earths, optical spectroscopy of rare earth compounds, interactions of rare earth ions with their crystalline environments, 2,2'-dipyridyl complexes of rare earths-II change in fluorescence intensities of europium and terbium chelates on ligand substitution, coordination and chemical equilibrium in chelate laser materials, optimum activator concentrations in rare-earth oxide phosphors, efficiency of Eu (+3) fluorescence in oxygen-dominated host lattices, on the enhancement of the fluorescence of aqueous solutions of neodymium, samarium and dysprosium chlorides, low-temperature optical studies of rare-earth cyclopentadienides, spectroscopic study of cerium in yttrium gallium and yttrium iron garnet, some new electron-transfer spectra of trivalent lanthanides, optical and physical properties of single crystal lanthanum trifluoride, localized H (-) modes in rare earth trifluorides in vibronic spectra, spectral characteristics of Nd (3+) and Er (3+) triethylenetetraminehexaacetic acid complexes, some chromogenic reagents for the lanthanoids.

AD-627 222 Fld. 7/2, 20/12, 20/10, 7/4
CFSTI Prices: HC $4.00 MF $0.75
IOWA STATE UNIV OF SCIENCE AND TECH AMES
RARE EARTH RESEARCH CONFERENCE (5TH), AUGUST 30, 31, SEPTEMBER 1, 1965, BOOK TWO. SOLID STATE SESSION P-1.
1965, 112p. Contract AF-AFOSR-812-65
AFOSR 65-1917-Bk-2

Unclassified report

See also AD-627 221.

Descriptors: (*Rare earth elements, Symposia), (*Symposia, Rare earth elements), (*Solid state physics, Rare earth elements), Magnetic properties, Hysteresis, Thermal properties, Terbium, Magnetostriction, Band theory of solids, Infrared spectroscopy, Gadolinium, Thermal conductivity, Resistance (Electrical), Samarium, Cryogenics, Cerium, Alloys, Atomic properties

Contents: initial susceptibility investigation of magnetic transitions in several rare earth metals, thermal hysteresis in ferromagnetic transitions; distribution of magnetic moment density in Tb; magnetostriction in the heavy rare earth metals; observation of optical absorption bands associated with magnetic order in rare-earth metals; infrared absorption structure in rare earth metals, relationship to spin arrangement and band structure; electron-spinwave scattering in gadolinium; thermal conductivity and electrical resistivity of samarium at low temperatures; results of augmented plane wave calculations of the band structure of cerium metal; theoretical results for positron annihilation in rare earth metals; high pressure polymorphism and magnetic ordering in some Sm-type rare earth alloys and samarium; valence bond formation in the closepacked rare earth metals.

AD-627 223 Fld. 7/2, 7/3, 20/2
CFSTI Prices: HC $4.00 MF $1.00
IOWA STATE UNIV OF SCIENCE AND TECH AMES
RARE EARTH RESEARCH CONFERENCE (5TH), AUGUST 30, 31, SEPTEMBER 1, 1965. BOOK THREE. CHEMISTRY SESSION C.
1965, 137p. Contract AF-AFOSR-812-65
AFOSR 65-1917-Bk-3

Unclassified report

See also AD-627 222.

Descriptors: (*Rare earth elements, Symposia), (*Symposia, Rare earth elements), (*Chemistry, Rare earth compounds), Crystal structure, Alloys, Sulfides, Selenium alloys, Telurium alloys, Yttrium alloys, Yttrium compounds, Samarium compounds, Oxides, Praseodymium compounds, Sodium compounds, Molybdenum compounds, Uranium compounds, Cerium compounds, Chelate compounds, Acetones, Transition elements, Separation, Carbonates, Promethium, Europium, Solvent extraction, Calorimeters

Contents: crystal chemistry of the sulfides, selenides and tellurides of the rare earths and yttrium; on the monoxide of samarium; mixed crystal phases with praseodymium dioxide; preparation and some properties of sodium-rare earth mixed oxides; crystal structure of the rhombohedral mO3.3R2O3 compounds (M=U, W and Mo) and their relation to ordered R7O12 phases; nonstoichiometry of UO2-CeO2, the system UO2CeO2-CeO1.5 at 900-1200C; the successive stabilities of the rare earth 1-hydroxycyclopentane carboxylic acid chelates; acetylacetonates of transition metals and rare earth metals; separation des elements des terres rares par solubilite relative de leurs carbonates dans l'eau chargee de gaz carbonique; preparation of the carbonates of the rare earths from some of their organic acid salts; preparation and properties of promethium and some of its compounds, kinetic studies on extraction of europium by lithium amalgam and comparison to removal by electrolysis; a solution calorimeter with automatic adiabatic control designed for rare earth research.

AD-627 224 Fld. 7/2, 20/12
CFSTI Prices: HC $4.00 MF $0.75
IOWA STATE UNIV OF SCIENCE AND TECH AMES
RARE EARTH RESEARCH CONFERENCE (5TH), AUGUST 30, 31, SEPTEMBER 1, 1965. BOOK FOUR. SOLID STATE SESSION P-2.
1965, 109p. Contract AF-AFOSR-812-65
AFOSR 65-1917-Bk-4

Unclassified report

See also AD-627 223.

Descriptors: (*Rare earth elements, Symposia), (*Symposia, Rare earth elements), (*Solid state physics, Rare earth compounds), Magnetic properties, Praseodymium compounds, Thermal properties, Gadolinium alloys, Boron alloys, Cryogenics, Carbides, Superconductivity, Lanthanum compounds, Chalcogens, Oxides, Cerium compounds, Electrical properties, Alloys, Tungsten alloys, Bronze, Garnet, Palladium, Ferromagnetism

Contents: magnetic characteristics of Pr compounds having the rock-salt structure, thermal anomalies and thermocynamic properties of gadolinium hexaboride, magnetic properties of rare-earth carbides MC1-x, superconducting lanthanum chalcogenides, the magnetic susceptibility of rare earth oxides below 4.2K, electrical conduction and dielectric properties of ceramic and single crystal cerium oxide, dielectric and mechanical losses due to calcium-oxygen vacancy pairs in cerium dioxide, rare earth tungsten bronzes, fluorine-free flux for growth of rare earth garnets, ferromagnetism in dilute solutions of rare earths in palladium.

AD-627 225 Fld. 7/2, 11/6
CFSTI Prices: HC $4.00 MF $1.00
IOWA STATE UNIV OF SCIENCE AND TECH AMES
RARE EARTH RESEARCH CONFERENCE (5TH), AUGUST 30, 31, SEPTEMBER 1, 1965. BOOK FIVE. METALLURGY SESSION M.
1965, 127p. Contract AF-AFOSR-812-65
AFOSR 65-1917-Bk-5

Unclassified report

See also AD-627 224.

Descriptors: (*Rare earth elements, Symposia), (*Symposia, Rare earth elements), (*Metallurgy, Rare earth elements), Alloys, Solid solutions, Gold alloys, Phase studies, Magnesium alloys, Lanthanium alloys, Aluminum alloys, Crystal structure, Intermetallic compounds, Copper alloys, Silver alloys, Gallium alloys, Iron alloys, Praseodymium compounds, Neodymium alloys, Samarium compounds, Ytterbium, Antimony, Yttrium, Cobalt alloys, Rhenium alloys, Manganese alloys, Gadolinium, Electrolysis, Cerium, Neodymium, Density, Transport properties

Contents: electronic states of rare-earth metals in alloys, solid solubility of some gold-rich-rare-earth and lanthanide-rich magnesium alloys, systematic arrangement of the binary rare-earth aluminum systems, crystal structures of compounds of the rare earths with Cu, Ag, Au and Ga, the crystal structures of CeFe7, PrFe7, NdFe7, and SmFe7, the crystal chemistry of the intermediate phases in the ytterbiumantimony system, the yttrium-cobalt alloy system, preparation of RE-Mn alloys by the 'Amalgam Process' x-ray-, differential thermal and thermomagnetic analyses, solid-state electrolysis of gadolinium, electrotransport of interstitial atoms in yttrium, the liquid densities of cerium and neodymium metals.

AD-627 226 Fld. 7/2, 20/12, 11/6
CFSTI Prices: HC $3.00 MF $0.75
IOWA STATE UNIV OF SCIENCE AND TECH AMES
RARE EARTH RESEARCH CONFERENCE (5TH), AUGUST 30, 31, SEPTEMBER 1, 1965. BOOK SIX. SOLID STATE SESSION P-3.
1965, 80p. Contract AF-AFOSR-812-65
AFOSR 65-1917-Bk-6

Unclassified report

Descriptors: (*Rare earth elements, Symposia), (*Symposia, Rare earth elements), (*Solid state physics, Rare earth elements), Band theory of solids, Electron transitions, Excitation, Anisotropy, Cerium, Doping, Electrical conductance, Resistance (Electrical), Cryogenics, Gadolinium alloys, Magnetic properties, Alloys, Thorium alloys, Holmium, Paramagnetism

Contents: exchange interactions in rare earth metals, some theoretical aspects of heavy rare earth metals, experimental study of the excitations in rare-earth metals, the indirect exchange interaction in the rare earth metals, effects of dilute rare-earth additions on the electrical conductivity of cerium at low temperatures, spin dependence of the electrical resistivities of gadolinium alloys, magnetic transformation in heavy rare-earth alloys with each other, magnetic properties of rare earth-thorium alloys, paramagnetic studies of holmium by neutron total cross section measurements.

AD-626 868 See Fld. 20/2

AD-626 884 See Fld. 7/4

AD-626 885 See Fld. 7/4

AD-626 886 See Fld. 7/4

AD-626 985 See Fld. 9/1

AD-627 054 See Fld. 13/12

AD-627 105 See Fld. 7/4

AD-627 253 See Fld. 21/9

7/3. ORGANIC CHEMISTRY

AD-626 665 Fld. 7/3
DUKE UNIV DURHAM N C DEPT OF CHEMISTRY
ACYLATION VS. CONJUGATE ADDITION OF DIPOTASSIO BETA-DIKETONES WITH CINNAMIC ESTERS. SYNTHESIS OF UNSATURATED 1,3,5TRIKETONES AND T-BUTYL 5,7-DIOXOALKANOATES,
by Fred B. Kirby, Thomas M. Harris, and Charles R.Hauser. 5 Mar 63, 7p. Contract DA-ARO (D)-31-124-G409
AROD 3581:14

Unclassified report

Availability: Published in Journal of Organic Chemistry v28 p2266-71 1963. Copies to DDC users only.

Descriptors: (*Ketones, Chemical reactions), (*Esters, Chemical reactions), Potassium compounds, Acetones, O-heterocyclic compounds, Synthesis (Chemistry)

The dipotassio salts of benzoylacetone and certain related beta-diketones, prepared by means of two molecular equivalents of potassium amide in liquid ammonia, were acylated with phenyl cinnamate to form unsaturated 1,3,5-triketones. These products were cyclized by means of sulfuric acid to give unsaturated 4-pyrones. Several dipotassiobeta-diketones were condensed with t-butyl cinnamate to afford the conjugate addition products, certain of which were cleaved to produce appropriate derivatives. Methyl cinnamate exhibited, toward dipotassiobenzoylacetone, both acylation and conjugate addition. Studies were made on the influence of variations in the molecular ratios of beta-diketone to ester on the yields of triketones from acylations of certain betadiketones with phenyl cinnamate and with phenyl and methyl benzoates. (Author)

AD-626 666 Fld. 7/3
DUKE UNIV DURHAM N C DEPT OF CHEMISTRY
REACTIONS OF 1,1-DICHLORO- 2,2-DIPHENYLETHENE AND 1,1,1-TRICHLORO- 2,2-DIPHENYLETHANE WITH NUCLEOPHILIC REAGENTS. A NEW METHOD FOR CERTAIN ALLENES,
by Fred B. Kirby, William G. Kofron, and Charles R.Hauser. 25 Mar 63, 5p. Contract DA-ARO (D)-31-124-G409
AROD 3581:15

Unclassified report

Availability: Published in Journal of Organic Chemistry v28 p2176-9 1963. Copies to DDC users only.

Descriptors: (*Halogenated hydrocarbons, Chemical reactions), (*Aromatic compounds, Chemical reactions), (*Dienes, Synthesis (Chemistry)), Ethylenes, Substitution reactions, Potassium compounds, Amides, Acetonitriles, Alkynes

1,1,1-Trichloro- 2,2-diphenylethane underwent dehydrohalogenation with potassium amide in liquid ammonia to form 1,1-dichloro- 2,2-diphenylethene (I), which reacted further with this reagent to give diphenylacetonitrile. The latter reaction presumably involved nucleophilic substitution, followed by dehydrohalogenation. Dichloroethene I and its p-chloro derivative reacted with potassium diphenylmethide in liquid ammonia to afford 1, 1,3,3tetraphenylallene and its p-chloro derivative, respectively. These reactions also presumably involved nucleophilic substitution, followed by dehydrohalogenation. However, I was converted by potassium triphenyl-methide slowly in liquid ammonia and faster in refluxing tetrahydrofuran to tolane. This product presumably arose through displacement on halogen, followed by rearrangement. I was converted to tolane by phenyllithium in ether. (Author)

AD-626 667 Fld. 7/3
DUKE UNIV DURHAM N C DEPT OF CHEMISTRY
RING VERSUS SIDE-CHAIN METALATION OF BENZYLDIMETHYLAMINE WITH BUTYLSODIUM AND PHENYLSODIUM. ISOMERIZATIONS OF METALLO DERIVATIVES,
by Walter H. Peterbaugh, and Charles R. Hauser. 1 Apr 63, 5p. Contract DA-ARO (D)-31-124-G409
AROD 3581:16

Unclassified report

Availability: Published in Journal of the American Chemical Society v85 p2467-70 1963. Copies to DDC users only.

Descriptors: (*Aromatic compounds, Metallation), (*Metallation, Molecular isomerism), (*Metalorganic compounds, Synthesis (Chemistry)), Amines, Sodium compounds, Lithium compounds, Alcohols

Metalation of benzyldimethylamine (I) with n-butylsodium or n-amylsodium in hexane at 25-30 afforded initially the o-sodium derivative, which isomerized to give the alphasodio derivative (II). These alkali intermediates were condensed with benzophenone to produce the corresponding amino alcohols. The relative yields of these products were dependent on the time allowed for metalation. However, alpha-lithio benzyldimethylamine, prepared from alphasodio derivative II and lithium bromide, underwent the reverse isomerization at 48 to give the o-lithio derivative. Metalation of amine I with phenylsodium afforded only the alpha-sodio derivative II. (Author)

AD-626 686 Fld. 7/3
DUKE UNIV DURHAM N C DEPT OF CHEMISTRY
O-METALATION OF BENZYLDIMETHYLAMINE AND RELATED AMINES WITH N-BUTYLLITHIUM. CONDENSATIONS WITH CARBONYL COMPOUNDS TO FORM ORTHO DERIVATIVES,
by Frank N. Jones, Rann L. Vaulx, and Charles R.Hauser. 20 Aug 63, 6p. Contract DA-ARO (D)-31-124-G409
AROD 3581:17

Unclassified report

Availability: Published in The Journal of Organic Chemistry v28 p3461-5 Dec 1963. Copies to DDC users only.

Descriptors: (*Aromatic compounds, Metalation), (*Amines, Metalation), (*Metalation, Amines), (*Metalorganic compounds, Synthe-

sis (Chemistry)), Lithium compounds, Condensation reactions, Aldehydes, Ketones, Alcohols, Amides, Benzonitriles, Benzophenones, Benzaldehydes, Esters

O-Lithiobenzyl dimethylamine (I'), prepared by metalation of benzyldimethylamine (I) with n-butyllithium in ether, was condensed with several aldehydes and ketones to form the corresponding aminocarbinols in good yields. I' was condensed with benzonitrile, phenyl isocyanate, cyclohexene oxide, and methyl benzoate to give the corresponding amino ketone, amino amide, aminocarbinol, and diaminocarbinol, respectively. Similarly the olithioamines, prepared by metalation of dibenzylmethylamine and alpha, alpha-dimethylbenzyl dimethylamine, were condensed with benzaldehyde and benzophenone, respectively. These reactions furnish a useful method for the synthesis of various ortho derivatives of the amines. (Author)

AD-626 792 Fld. 7/3, 2/1, 6/1, 6/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
FORUM OF RESEARCH AND TECHNICAL CHEMISTS.
Dec 65, 9p. Rept. no. FSTC-381-T65-616
TT 66-60286
Unclassified report

Trans. of Priroda (USSR) n8 p71-4 Aug 1965.

Descriptors: (*Chemistry, USSR), Symposia, Agriculture, Chemical industry, Foods, Public health

AD-626 821 Fld. 7/3, 19/1
CFSTI Prices: HC $1.00 MF $0.50
HOLMAN (JOHN F) CO INC WASHINGTON D C
ELECTRONIC STRUCTURE OF PHENYLAZIDE AND OF SOME OF ITS DERIVATIVES,
by Giorgio Favini. Dec 65, 16p. Contract DA-44-009-AMC-930 (T) Proj. DA-1-C-014-501-A-32-B-01
AERDL T-1811-65, TT66-60293
Unclassified report

Trans. of Gazzetta Chimica Italiana, v91 p270-9 1961.

Descriptors: (*Explosive materials, Azides), (*Azides, Molecular structure), (*Molecular orbitals, Azides), Electrons, Chemical bonds, Dipole moments, Perturbation theory, Benzenes, Italy

The method of molecular orbital calculations was applied to phenylazide by calculating the electronic density, the order of the bonds and the atomic distances for the two possible structures with the linear azide group and with the angle CNN of 120 or 180 degrees, respectively. From a comparison of the theoretical and the experimentally obtained dipole moments, the first structure seems to be the most probable one. By successively applying the perturbation method, the effect of a substituent at the benzene ring in the p position with respect to the N3 group, could be evaluated and a satisfactory agreement between the theoretical and the experimentally obtained dipole moments for several p substituted phenylazides was evaluated. (Author)

AD-626 925 Fld. 7/3, 7/5
NAVAL ORDNANCE TEST STATION CHINA LAKE CALIF
OXIDATION AND CHEMILUMINESCENCE OF TETRAKIS (DIMETHYLAMINO) ETHYLENE. I. REVERSIBLE REACTIONS OF OXYGEN WITH TETRAKIS (DIMETHYLAMINO) ETHYLENE AND N-DECANE,
by Carl A. Heller, and Aaron N. Fletcher. 1 Mar 65, 9p. Rept. no. NOTS-TP-3999
Contract arpa order-285-62-AM5 Task RMMO-32-024/216-1/F008-17-02
NAVWEPS 9015
Unclassified report

Availability: Published in Journal of Physical Chemistry v69 n10 p3313-7 Oct 1965. Copies to DDC users only.

Descriptors: (*Chemiluminescence, Amines), (*Amines, Oxidation), (*Ethylenes, Oxidation), (*Alkanes, Oxidation), Oxygen, Chemical reactions, Chemical equilibrium, Solubility, Heat of solution, Heat of formation, Enthalpy, Absorption spectrum

The solubility and heat of solution of oxygen in n-decane and tetrakis (dimethylamino) - ethylene (TMAE) were measured and found to be almost equal. The spectrally measurable interaction species, TMAE-02 and n-C10H22-02, are shown to have very low enthalpy of formation (-1.2 and -0.4 kcal.). Thus, in nonpolar media the good electron donor TMAE and poor electron donor n-decane react similarly with oxygen. (Author)

AD-627 210 Fld. 7/3, 6/12, 11/1
CFSTI Prices: HC $1.00 MF $0.50
ARMY MEDICAL BIOMECHANICAL RESEARCH LAB WALTER REED ARMY MEDICAL CENTER WASHINGTON D C
SYNTHESIS AND DEGRADATION OF POLY ALKYL ALPHA CYANOACRYLATES.
Final rept.,
by Fred Leonard, R. K. Kulkarni, George Brandes, and Joshua Nelson. Nov 65, 25p.
Rept. no. TR-6520
Proj. DA-3A013001A91C
Unclassified report

Descriptors: (*Acrylic resins, Synthesis (Chemistry)), (*Adhesives, Acrylic resins), (*Tolerances (Physiology), Adhesives), Degradation, Reaction kinetics, In vitro analysis, Formaldehyde, Nitriles, Tissues (Biology)

In order to study structure-tissue reactivity relationships and ultimately develop a less necrotizing adhesive, a study of the synthesis and degradation of the homologous series of alpha cyanoacrylate monomers and polymers was undertaken. A method for synthesizing high purity cyanoacrylates and some of their chemical and physical properties are presented. In vitro kinetics studies under heterogeneous and homogeneous conditions indicate that cyanoacrylate polymers degrade by hydrolytic scission of the polymer chain. In homogeneous solution, under alkaline conditions, the rate of degradation is considerably higher than under neutral conditions and the rates obtained with the methyl to the butyl derivative are of the same order. A proposed mechanism of degradation is presented. Medical evaluation indicated that as the homologous series is ascended, the greater the tissue tolerance to the monomers and polymers. The relevance of the results of the in vitro studies to this medical finding is presented. (Author)

AD-627 229 Fld. 7/3
CFSTI Prices: HC $1.00 MF $0.50
CHEMICAL RESEARCH AND DEVELOPMENT LABS EDGEWOOD ARSENAL MD
ISOCYANIDE SYNTHESIS.
Rept. for Oct-Nov 64,
by Daniel J. Hoy, and Edward J. Poziomek. Dec 65, 11p. Rept. no. CRDLR-3329
Task 1C622401A10204
Unclassified report

Descriptors: (*Nitriles, Synthesis (Chemistry)), Evaporators, Formamides, Distillation, Organic sulfur compounds, Chlorides, Boiling point

Methyl, n-butyl, sec-butyl, and tert-butyl isocyanides were prepared by reacting p-toluenesulfonyl chloride, quinoline, and the corresponding N-alkyl formamide in a rotary evaporator at 1.5-mm. Hg pressure. The isocyanides distill upon formation and were collected in a dry ice trap. One distillation without a fractionating column gave a 50% to 75% yield of chromatographically (GLC) pure product. The simplicity of the procedure and facility of obtaining large quantities of high purity aliphatic isocyanides is a distinct improvement over published procedures. This procedure is recommended for the synthesis of all isocyanides having a boiling point of 150-175C/760 mm or less. Optimum yields will be obtained when a reaction flask size of no less than 2 liters, a formamide charge of no more than 25 gm, and a pressure of no greater than 2.0 mm are used. (Author)

AD-626 847 See Fld. 11/9

AD-626 924 See Fld. 7/5

AD-626 942 See Fld. 7/4

AD-626 947 See Fld. 7/4

AD-627 060 See Fld. 7/2

AD-627 221 See Fld. 7/2

AD-627 223 See Fld. 7/2

7/4. PHYSICAL CHEMISTRY

AD-626 671 Fld. 7/4
CALIFORNIA UNIV SANTA BARBARA DEPT OF PHYSICS
CHARGE-TRANSFER EXCITATION OF CO+ COMETTAIL BANDS BY LOW N2+ IONS.
Technical rept.,
by Nyle G. Utterback, and H. P. Broida. 2 Aug 65, 3p. Rept. no. TR-13
Contract Nonr-4222 (01) ,ARPA Order-125
Unclassified report

Prepared in cooperation with General Motors Defense Research Labs., Santa Barbara, Calif.

Availability: Published in Physical Review Letters v15 n15 p608-9 11 Oct 1965. Copies to DDC users only.

Descriptors: (*Carbon monoxide, Excitation), (*Ion bombardment, Carbon monoxide), (*Nitrogen, Ion bombardment), Ions, Band spectrum, Spectrum analyzers

AD-626 745 Fld. 7/4, 7/5
CFSTI Prices: HC $1.00 MF $0.50
ROCHESTER UNIV N Y
STATUS OF RESEARCH PROBLEMS.
Status rept. no. 27,
by A. B. F. Duncan. 1 Jan 66, 2p. Contract Nonr-668 (15) Proj. NR-014-107
Unclassified report

See also AD-620 425.

Descriptors: (*Benzene, Absorption spectrum), (*Sulfur compounds, Fluorescence), Temperature, Deuterated compounds, Molecular spectroscopy, Electron transitions, Dioxides, Photochemistry

Absorption of Benzene in the 2000 A Region: Systematic measurements of absorption at an extensive series of pressures and temperatures showed a new resolved vibrational transition ((1 yields 0) in absorption) from a first vibrational level of the ground state to the zero vibrational level of the second excited state. Systematic study of C6D6 under the same conditions showed an analogous transition. The new (1 yields 0) transition is significant in relation to interpretation of the electronic transition responsible for absorption in this region and the nature of the excited electronic state. Slight photochemical decomposition of C6H6 and C6D6 occurs after continued exposure to the hydrogen continuum used as background source. Decomposition is eliminated or greatly reduced by interposing a thin film of liquid water between the source and absorption cell, which removes radiation near 1850 A responsible for the photochemical reaction. Lifetime of the First Excited

State of SO2: Further attempts were made to obtain uncontaminated spectra of SO2 with an electrodeless discharge from a Tesla coil, but at pressures one mm. the impurity (decomposition) spectra were more intense than the SO2 spectrum. Measurements of the lifetime of decay of fluorescence were made. Below one mm pressure, an apparent value about 20 microseconds was found. This value was independent of the pressure in this range and independent of wavelength.

AD-626 747 Fld. 7/4, 20/5
CFSTI Prices: HC $1.00 MF $0.50
TORONTO UNIV (ONTARIO) DEPT OF PHYSICS
SIMULATED RAMAN EMISSION AND ABSORPTION SPECTROSCOPY.
Status rept.,
by B. P. Stoicheff. Sep 65. 4p. Contract Nonr-5012 (00) Proj. NR-015-813
Unclassified report

Descriptors: (*Raman spectroscopy, Scientific research), Lasers, Absorption spectrum, Excitation, Molecular spectroscopy, Scattering

AD-626 748 Fld. 7/4, 20/6, 20/12
CFSTI Prices: HC $1.00 MF $0.50
PENNSYLVANIA UNIV PHILADELPHIA
OPTICAL AND MICROWAVE SPECTROSCOPY OF SOLIDS.
Semi-annual status rept. 1 Jul-31 Dec 65.
31 Dec 65. 8p. Contract Nonr-551 (51) Proj. NR-017-216
Unclassified report

Descriptors: (*Solids, Spectroscopy), (*Spectroscopy, Solids), Microwave spectroscopy, Infrared spectroscopy, Lithium compounds, Hydrogen compounds, Deuterium compounds, Copper compounds, Chlorides, Films, Electric fields, Optical phenomena, Cyclotron resonance phenomena, Plasma physics, Tellurium, Semiconductors

Contents: lattice dynamics, free carrier optical phenomena, tellurium.

AD-626 808 Fld. 7/4, 20/6
CFSTI Prices: HC $4.00 MF $0.75
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF PHYSICS
TECHNICAL REPORT FOR THE PERIOD 1 OCTOBER 1963 THRU 31 DECEMBER 1965,
by D. H. Rank. 31 Dec 65, 126p. Contract Nonr-656 (12) Proj. NR-014-401
Unclassified report

See also AD-419 084.

Descriptors: (*Molecules, Optical properties), (*Spectroscopy, Molecular properties), (*Atmosphere, Chemical properties), (*Lasers, Optical phenomena), (*Infrared phenomena, Molecular properties), Methane, Concentration (Chemistry), Hydrochloric acid, Absorption spectrum, Liquids, Brillouin zones, Oxygen, Raman spectroscopy, High-pressure research, Helium group gases

Contents: Abundance of methane in the Earth's atmosphere, by Uwe Fink, T. A. Wiggins, and D. H. Rank; Infrared absorption spectra of isotopic dimeric hydrogen chloride molecules, by D. H. Rank, W. A. Glickman, and T. A. Wiggins; Brillouin spectra of liquids using He-Ne laser, by D. H. Rank, E. M. Kiess, Uwe Fink, and T. A. Wiggins; Stimulated Brillouin scattering in liquids, by T. A. Wiggins, R. V. Wick, D. H. Rank, and A. H. Guenther; Laser induced breakdown in oxygen gas at high pressure, by T. A. Wiggins, R. V. Wick, D. H. Rank, and A. H. Guenther; Stimulated Raman effect in some tetrahedral molecules, by D. H. Rank, R. V. Wick, and T. A. Wiggins; Stimulated Brillouin effect in high pressure gases, by D. H. Rank, T. A. Wiggins, R. V. Wick, D. P. Eastman, and A. H. Guenther; Brillouin spectra of viscous liquids, by D. H. Rank, E. M. Kiess, and Uwe Fink; Threshold for stimulated Raman spectra, by R. V. Wick, T. A. Wiggins, and D. H. Rank; Center of dispersion forces in HCl interacting with rare gas atom, by R. Herman.

AD-626 823 Fld. 7/4
LYMAN LAB OF PHYSICS HARVARD UNIV CAMBRIDGE MASS
ROTATIONAL MAGNETIC MOMENT OF BAO,
by R. Brooks, and M. Kaufman. 26 Jul 65, 3p. Contract Nonr-1866 (19) Proj. NR-024-012
Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n9 3406-7 Nov 1 1965. Copies to DDC users only.

Descriptors: (*Barium compounds, Oxides), (*Magnetic moments, Barium compounds), Nuclear magnetic resonance, Molecular beams, Chemical bonds, Molecular energy levels

The rotational magnetic moment of barium oxide was measured by the molecular-beam magnetic resonance technique. Resonance frequencies were observed at 67.16 kc and 92.49 kc for magnetic fields of 849 H and 1178 H, respectively. A gyromagnetic ratio of 0.103 plus or minus 0.001 nuclear magnetons per quantum of angular momentum was obtained. The results are interpretated in terms of energy states.

AD-626 826 Fld. 7/4, 20/12
COLUMBIA RADIATION LAB NEW YORK
SUPERCONDUCTING AND NORMAL SPECIFIC HEATS OF A SINGLE CRYSTAL OF NIOBIUM,
by H. A. Leupold, and H. A. Boorse. 24 Jan 64, 8p. Contract Nonr-266 (45) Proj. NR-014-302
Unclassified report

Availability: Published in the Physical Review v134 n5A pA1322-8 Jun 1 1964. Copies to DDC users only.

Descriptors: (*Niobium, Specific heat), Cryogenics, Single crystals, Super conductivity, Aomalies, Test methods, Experimental data, Transition temperature, Phase studies

The anomalous specific heat found in a polycrystalline sample of niobium and previously report from this laboratory by Hirshfeld, Leupold, and Boorse (HLB) prompted complete remeasurements both in the normal and superconducting phases on a single crystal with lower tantalum content. The thermal constants of the single crystal show only small differences from the polycrystal in the same temperature range, the singlecrystal values being T sub c = 9.20K and theta = 241K between about 10 and 3K. The normal-state single-crystal measurements agree with measurements on the HLB polycrystal made both in this laboratory and by van der Hoeven and Keesom at Purdue University. The latter measurements were carried to about 0.4K in a field of 17 kG. As a result of their investigation, they report a Debye theta of 275K in the region below 3K. With this value of theta, the anomaly in the specific heat disappears. As both the single-crystal results and the van der Hoeven and Keesom values agree in the mutually measured ranges, theta is taken to be 275K. The corresponding value of gamma is found to be 7.80 mJ/mole deg squared. The usual exponential behavior of the electronic specific heat C sub (es)/gamma T sub c = 1/ae to the bT sub c/T power with alpha = 8.21 and beta = 1.52, is observed over a restricted temperature range. Below t=5 the data exhibit larger values than predicted by the exponential in agreement with a number of other superconductors. The value of the energy gap at 0K was found to be 3.69 kT sub c. Overall comparisons are made with the BCS theory and a modification due to Swihart. (Author)

AD-626 884 Fld. 7/4, 7/2, 20/13
DELAWARE UNIV NEWARK DEPT OF CHEMISTRY
THERMODYNAMICS OF THE HIGHER OXIDES. I. THE HEATS OF FORMATION AND LATTICE ENERGIES OF THE SUPEROXIDES OF POTASSIUM RUBIDIUM, AND CESIUM,
by L. A. D'Orazio, and R. H. Wood. 12 Jan 65, 9p. Contract AF-AFOSR-325-63 Proj. AF-9750 Task 975001
AFOSR 65-1956
Unclassified report

Availability: Published in Journal of Physical Chemistry v69 n8 p2550-7 Aug 1965. Copies to DDC users only.

Descriptors: (*Oixdes, Thermodynamics), (*Potassium compounds, Thermodynamics), (*Rubidium compounds, Thermodynamics), (*Cesium compounds, Thermodynamics), Peroxides, Heat of formation, Crystal lattices, Energy, Approximation (Mathematics), Lithium compounds

The heats of formation of KO2, RbO2, and CsO2 were determined at 25.0C. They were -68.0 plus or minus 0.4, -68.0 plus or minus 0.6, and -69.2 plus or minus 0.5 kcal./mole, respectively. The lattice energies of these compounds and the electron affinity of molecular oxygen (EA = 14.9 kcal./mole) were calculated using various approximations. The accuracy resulting from the use of the approximations is assessed. The heats of formation (-62 kcal./mole) and decomposition of hypothetical lithium superoxide are estimated. The results indicate that this compounds should be very unstable. (Author)

AD-626 885 Fld. 7/4, 7/2, 20/13
DELAWARE UNIV NEWARK DEPT OF CHEMISTRY
THERMODYNAMICS OF THE HIGHER OXIDES. II. LATTICE ENERGIES OF THE ALKALI AND ALKALINE EARTH PEROXIDES AND THE DOUBLE ELECTRON AFFINITY OF THE OXYGEN MOLECULE,
by R. H. Wood, and L. A. D'Orazio. 12 Jan 65, 7p. Contract AF-AFOSR-325-63 Proj. AF-9750 Task 975001
AFOSR 65-1958
Unclassified report

See also AD-626 884.

Availability: Published in Journal of Physical Chemistry v69 n8 p2558-61 Aug 1965. Copies to DDC users only.

Descriptors: (*Oxides, Thermodynamics), (*Alkali metal compounds, Thermodynamics), (*Alkaline earth compounds, Thermodynamics), (*Oxygen, Chemical reactions), Peroxides, Molecular association, Crystal lattices, Chemical bonds, Energy

The Madelung constants for the alkali metal peroxides and the van der Waals sums for both the alkali and alkaline earth peroxides were calculated. The results are used to evaluate the lattice energies of the peroxides and the double electron affinity of the oxygen molecule (-145 + or - 15 kcal/mol). The covalent bond energy in the peroxide ion (-95 kcal/mol) is discussed. (Author)

AD-626 886 Fld. 7/4, 7/2, 20/13
DELAWARE UNIV NEWARK DEPT OF CHEMISTRY
THERMODYNAMICS OF THE HIGHER OXIDES. III. THE LATTICE ENERGY OF POTASSIUM OZONIDE AND THE ELECTRON AFFINITY OF OZONE,
by R. H. Wood, and L. D. D'Orazio. 12 Jan 65, 5p. Contract AF-AFOSR-325-63 Proj. AF-9750 Task 975001
AFOSR 65-1959
Unclassified report

See also AD-626 885.

Availability: Published in Journal of Physical Chemistry v69 n8 p2562-3 Aug 1965. Copies to DDC users only.

Descriptors: (*Oxides, Thermodynamics), (*Potassium compounds, Thermodynamics), (*Ozonides, Thermodynamics), (*Ozone, Chemical reactions), Molecular association, Crystal lattices, Energy, Heat of formation, Decomposition, Lithium compounds

The Madelung constant, van der Waals sums, and lattice energy of the potassium ozonide structure were calculated. The results were used to evaluate the electron affinity of ozone (44 plus or minus 10 kcal/mol) and the heat of formation of the gaseous ozonide ion (-11 plus or minus 10 kcal/mol). The heat of formation of the hypothetical lithium ozonide is estimated (-63 kcal/mol) and the energy of its decomposition evaluated. (Author)

AD-626 888 Fld. 7/4, 3/2
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
OBSERVATIONS OF POLARIZED OH EMISSION,
by S. Weinreb, M. L. Meeks, A. H. Barrett, and A. E. E. Rogers. 1965, 4p. Contract NsG-419

Unclassified report

Availability: Published in Nature v208 n5009 p440-1 30 Oct 1965. Copies to DDC users only.

Descriptors: (*Hydroxides, Free radicals), (*Radio astronomy, Microwave spectroscopy), Line spectrum, Polarization, Molecular spectroscopy

Observations are reported of emission lines near the source W3 which reveal that: (a) emission is present not only at 1,665 Mc/s but also at 1,667 Mc/s and 1,720 Mc/s with frequency spacings as predicted from the OH molecular spectrum; (b) some of the emission at 1,665 Mc/s is linearly polarized by as much as 37 per cent; (c) the position of the maximum 1,665 Mc/s emission is displaced from W3 by approximately 14 min of arc; (d) emission features as narrow as 1-1.5 kc/s have been observed.

AD-626 893 Fld. 7/4
LINCOLN LAB MASS INST OF TECH LEXINGTON
PARTIAL PRESSURE OF SE2 AND OPTICAL DENSITY OF SELENIUM VAPOR IN THE VISIBLE AND ULTRAVIOLET,
by R. F. Brebrick. 22 Jun 65, 6p.

Unclassified report

Supported by U. S. Air Force.

Availability: Published in The Journal of Chemical Physics v43 n9 p3031-6 1 Nov 1965. Copies to DDC users only.

Descriptors: (*Selenium, Physical properties), Vapors, Spectra (Visible + ultraviolet), Vapor pressure, Band spectrum, Chemical equilibrium, Absorption spectrum

The optical density of selenium vapor (O.D.) was measured between 1900 A and 2.0 microns to T0=860, 700, 500,400, and 330C and for total pressures (determined by the temperature of a liquid selenium appendage) between 0.00007 and 1.0 atm. Previously observed vibronic bands of Se2 are seen and have a maximum O.D. value near 3405 A. Between 1900 and 2700 A, O.D. is not linearly dependent upon the partial pressure of Se2, p2. The densities in this range bear a constant ratio to one another for fixed T0 over as many as two orders of magnitude in D2100 and appear to be due to a single species, Sen, n>2. Assuming D3405 is the sum of partial densities due to Se2 and Sen, each of which obeys Beers law, and that D2100 is proportional to pn then p2=π (D3405-kD2100)/ L, where L is the optical path length. The value of k, which is the ratio D3405/D2100 for pure Sen, is chosen to be 0.18 so that log D2100 varies linearly with log (D3405-0.18D2100). The Beers-law constant r is obtained from measurements at sufficiently low total pressures that the vapor is all Se2 in the optical cell and from published total-vapor-pressure measurements. The values of p2 obtained agree to within 8% or better with those calculated from the Se2-Se4-Se6-Se8 equilibrium constants of Illarionov and Lapina and are significantly lower than those calculated from the standard tabulation of Stull and Sinke. (Author)

AD-626 936 Fld. 7/4, 20/10
CFSTI Prices: HC $2.00 MF $0.50
UPPSALA UNIV (SWEDEN) QUANTUM CHEMISTRY GROUP
APPLICATION OF THE HELLMANN-FEYNMAN AND VIRIAL THEOREMS TO THE THEORETICAL CALCULATION OF MOLECULAR POTENTIAL CONSTANTS,
by Richard Schwendeman. 1 Jun 65, 28p. Rept. no. Scientific-45
Contract AF61 (052)-701
ARL 65-267

Unclassified report

Descriptors: (*Molecular energy levels, Potential theory), Wave functions, Stability, Quantum mechanics, Molecular properties, Potential energy, Field theory, Matrix algebra

The Hellmann-Feynman theorem is discussed with emphasis on the importance of the choice of integration variables to the appearance of the equations, the stability of the wave functions, and the reliability of calculations. The Hellman-Feynman expression for the z-component of the force on a single nucleus is differentiated successively to obtain expressions which are related to the harmonic and anharmonic potential constants in a molecule. The method used to simplify the differentiations is also used to derive two expressions for the field gradient part of the nuclear quadrupole coupling constant; the two expressions involve only convergent integrals. The virial-theorem expression for diatomic molecules is differentiated to obtain equations for the cubic and quartic potential constants and for the Dunham constants. Application of the equations to quantumchemical calculation of the potential constants is discussed. (Author)

AD-626 942 Fld. 7/4, 7/3
CFSTI Prices: HC $1.00 MF $0.50
BATTELLE MEMORIAL INST COLUMBUS OHIO
A KINETIC STUDY OF THE THERMAL DECOMPOSITION OF SELECTED CYCLOHEXYL AND PHENYLSILANES.
Research rept. 1 May 64-30 Apr 65,
by Robert W. Coutant, and Arthur Levy. Oct 65, 16p. Contract AF33 (615)-1807 Proj. AF-7023 Task 702301
ARL 65-215

Unclassified report

Descriptors: (*Silanes, Pyrolysis), (*Pyrolysis, Reaction kinetics), Decomposition, Disproportionation, Entropy, Heat of activation, Complex compounds

The decomposition kinetics of the phenylhydrosilanes (mono-, di-, and triphenylsilane) were studied with the aid of flow techniques. Decomposition occurs via second-order disproportionation reactions. Based on the kinetic factors of entropy and energy of activation and pre-exponentional factor, it is concluded that the decomposition occurs via a four-centered activated complex. (Author)

AD-626 947 Fld. 7/4, 7/3
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
KINETICS OF THE PYROLYSIS OF CELLULOSE OVER THE TEMPERATURE RANGE 250C-300C,
by Anne E. Lipska, and William J. Parker. 4 Nov 65, 32p. Rept. no. USNRDL-TR-928

Unclassified report

Descriptors: (*Cellulose, Pyrolysis), (*Pyrolysis, Reaction kinetics), Vaporization, Decomposition, Heat of activation

Pure alpha cellulose samples were subjected to isothermal pyrolysis in a fluidized bath in a nitrogen environment at temperatures ranging from 250C to 298C. Results were reported in terms of volatilization (based on weight loss measurements) and decomposition (in term of glucosan loss). The findings indicate that there are essentially three distinct chronological phases of pyrolysis at each temperature studied. After an initial rapid decomposition and weight loss period, both the volatilization and the decomposition obey an apparent zero - order expression, followed by a kinetically first order phase for the weight loss, resulting in a residual char deposit which does not undergo further pyrolysis. The degree of decomposition and volatilization occurring during the zero-order phase increases with increasing temperature. A single activation energy of 42 kcal/mole describes both the decomposition and volatilization rates over the entire 250C to 298C range. (Author)

AD-626 978 Fld. 7/4
CFSTI Prices: HC $2.00 MF $0.50
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
THE APPLICATION OF CALCULATION OF ION SOURCE SYSTEMS AND ION ENERGY SPREAD TO SOME OF THE PROBLEMS OF ION-MOLECULE INTERACTIONS,
by K. R. Ryan, and J. O. Terry. Aug 65, 33p.
Rept. no. ARL-65-170
Proj. AF-7023 Task 702303

Unclassified report

Descriptors: (*Reaction kinetics, Numerical analysis), (*Ions, Reaction kinetics), (*Mass spectroscopy, Reaction kinetics), Molecules, Chemical reactions, Ion sources, Energy, Concentration (Chemistry), Ion beams, Kinetic energy, Magnetic fields, Programming (Computers)

Calculations are described which were designed to support an experimental attempt to measure the specific reaction rate for typical ion-molecule reactions as a function of reactant ion energy. The time averaged specific reaction rate k is given by $k = Is/(Ip + Is)B$ (tau) where Ip and Is are the concentrations of the reactant ion and secondary ion respectively, B the concentration of neutral products and tau the total time for reaction. One possible instrument for measuring this energy dependent rate constant is a mass spectrometer. These calculations show that it is possible to obtain a small spread in the kinetic energy of the ions formed and then to measure the energy dependent rate constant. The source residence time for ions in mass spectrometer used is calculated, and the energy spread of the ion beam produced by a 20 nanosecond ionizing pulse was then computed for many conceivable experimental conditions. (Author)

AD-627 033 Fld. 7/4, 20/10
CFSTI Prices: HC $4.00 MF $0.75
AERONUTRONIC DIV PHILCO CORP NEWPORT BEACH CALIF
CALCULATION OF INELASTIC ELECTRON-ATOM AND ELECTRON-MOLECULE COLLISION CROSS SECTIONS BY CLASSICAL METHODS,
by Ernest Bauer, and Charlotte E. Bartky. Jan 65, 127p. Rept. no. U-2943

Unclassified report

Descriptors: (*Ionization, Probability), (*Molecular energy levels, Excitation), (*Atomic energy levels, Excitation), (*Electron bombardment, Probability), Energy, Quantum

mechanics, Wave functions, Inelastic scattering, Transport properties, Nitrogen, Diatomic molecules, Nitrogen compounds, Oxides, Oxygen, Carbon monoxide, Numerical analysis

Use was made of Thomson's, Gryzinski's and Ochkur's classical methods for energy transfer in electronic collisions together with the quantum mechanical FranckCondon factor for the overlap of nuclear wave functions to compute inelastic electron-molecule collision cross sections. Specific application is to ionization and to direct and exchange electronic excitation. After first extending previous applications of the classical energytransfer methods to atoms, we make calculations for a number of processes involving air molecules (N2, N2 (+), NO, O2, also CO). The results are applied to the near-threshold domain as well as to the overall behavior of the cross section. Agreement with the very few absolute experimental data available is to within better than a factor of 2-3. This must be regarded as encouraging when one considers that there exist hardly any experimental data on excitation and that quantum mechanical calculations would be prohibitively lengthy to carry out while the present calculations are very simple to perform. (Author)

AD-627 042 Fld. 7/4
CFSTI Prices: HC $3.00 MF $0.75
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)
THEORY OF SHIFTS OF VIBRATION-ROTATION LINES OF DIATOMIC MOLECULES IN NOBLE GAS MATRICES. INTERMOLECULAR FORCES IN CRYSTALS.
Technical (scientific) note,
by H. Friedmann, and S. Kimel. Jul 65, 63p.
Rept. no. TN-2
Contract AF61 (052)-838
AFCRL 65-783

Unclassified report

Descriptors: (*Infrared spectroscopy, Diatomic molecules), (*Diatomic molecules, Line spectrum), (*Crystals, Molecular association), (*Molecular association, Perturbation theory), Chemical bonds, Band spectrum, Vibration, Electrostatics, Hydrochloric acid, Deuterated compounds, Hydrogen compounds, Bromides, Argon, Krypton, Xenon, Field theory, Israel

It is shown that the observed shift of infrared lines of diatomic molecules trapped in noble gas crystals can be considered to be made up of a 'vibrational' shift of the band center with a superimposed 'rotational' shift dependent on the rotational quantum number J. These shifts were studied by means of a detailed analysis of the molecular motion. Shifts of HC1, DC1, HBr, and CO in Ar, Kr, and Xe matrices were obtained. Rotational shifts are interpreted by assuming that the trapped molecule is free to rotate about a point which does not coincide with the molecular center of mass. The resulting coupling between the rotational motion of the molecule and its constrained translational motion in the lattice is treated as a perturbation. The relation between this theory and the crystal field theory is discussed.

AD-627 058 Fld. 7/4, 20/12
CFSTI Prices: HC $1.00 MF $0.50
UPPSALA UNIV (SWEDEN) QUANTUM CHEMISTRY GROUP
DIFFERENT BANDS FOR DIFFERENT SPINS. III. SOLID ATOMIC HYDROGEN. SOME COMMENTS ON THE AMO METHOD FOR THE GROUND STATE OF THE HYDROGEN MOLECULE,
by Jean-Louis Calais, and Osvaldo Goscinski. 15 Jan 65, 19p. Rept. no. Scientific-34
Contract AF61 (052)-701 Proj. AF-7112
ARL 65-264

Unclassified report

Pub. in Arkiv For Fysik v29 n18/10 p255-72/135-44 1965. See also AD-625 411.

Descriptors: (*Solidified gases, Hydrogen), (*Band theory of solids, Hydrogen), (*Hydrogen, Molecular orbitals), (*Molecular orbitals, Hydrogen), Nuclear spins, Crystals, Integrals, Potential energy, Atomic orbitals, Molecular energy levels, Sweden

The AMO method is applied to a body-centered cubic crystal of hydrogen atoms. All the many-centered integrals are taken into account, and the errors involved in these computations are estimated. To get meaningful results, quite high precision is needed. The results show a minimum in the potential energy curve, which is a little lower than the one obtained by Wigner and Huntington. The minimum occurs at an internuclear distance which is somewhat larger than the one obtained by Wigner and Huntington. A survey is given of some previous work both on solid atomic and solid molecular hydrogen. The possible implications of such calculations for planetary physics are also pointed out. A study was also made of the AMO method as applied to H2 for small internuclear distances. The AMO method was combined with a systematic scaling procedure, which is essential for small internuclear distances. The results show that the AMO method yields a lower energy than the MO method for all internuclear distances, provided that the total function is an eigenfunction of the total spin operator. Further some comments are made concerning the construction of AMO's from different kinds of MO's. (Author)

AD-627 072 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
STIMULATED RAMAN EFFECT OF SOME SUBSTANCES,
by M. E. Movseyan, Zh. O. Ninoyan, and L. T. Badalyan. 21 Dec 65, 7p. Rept. no. FTD-TT-65-1313
TT 66-60362

Unclassified report

Unedited rough draft trans. of Akademiya Nauk Armyanskoi SSR, Erevan. Doklady, v40 n4 p205-7 1965.

Descriptors: (*Organic compounds, Raman spectroscopy), (*Raman spectroscopy, Organic compounds), Chloroform, Benzenes, Chlorides, Chloroprenes, Alkanes, Acetophenones, Acetones, Ethers, USSR

Spectra were obtained of the stimulated Raman effect of anisole, chlorobenzene, chloroprene, dichlorethane, acetophenone, acetylacetone, and chloroform. The source of the excitation in the stimulated combination scattering was a ruby generator of power pulses which operated in an accumulation system. The spectra of the stimulated Raman effect were recorded by the photographic method on the spectrograph ISP-51 with the camera UF-84. For acetophenone frequencies of 2 oscillations were observed, one of 997/cm and another of 3066/cm: this was observed also for chlorobenzene and anisole. A splitting of the Stokes lines was often observed, especially for xylols, with an unsplit stimulant.

AD-627 105 Fld. 7/4, 11/6, 20/13, 7/2
TORONTO UNIV (ONTARIO) DEPT OF METALLURGY AND MATERIALS SCIENCE
ON THE RELATIONSHIP BETWEEN EQUILIBRIUM PRESSURES AND THE PHASE DIAGRAM OF A REACTIVE SYSTEM. THE SYSTEMS: NACL-NA2ZRCL6, KCL-K2ZRCL6, NACL-KCL-ZRCL4,
by R. L. Lister, and S. N. Flengas. 5 Feb 65, 23p.

Unclassified report

Availability: Published in Canadian Journal of Chemistry v43 p2947-69 1965. Copies to DDC users only.

Descriptors: (*Zirconium compounds, Phase studies), (*Complex compounds, Phase studies), (*Phase studies, Zirconium compounds), (*Vapor pressure, Zirconium compounds), Thermodynamics, Sodium compounds, Potassium compounds, Chlorides, Electrolysis, Zirconium, Refining (Metallurgy), Zirconates, Canada

The binary equilibrium phase diagrams for the systems NaCl-Na2ZrCl6 and KCl-K2ZrCl were established from the combined results of cooling curve and vapor pressure measurements. A portion of ternary NaCl-KCl-ZrCl4 was also determined. Vapor pressure measurements on the two pure compounds, Na2ZrCl6 and K2ZrCl6, as well as on mixtures with the respective alkali metal chlorides, were taken. The vapor-producing reaction is given as $M2ZrCl6 = 2MCl + ZrCl4$ (v), where M represents, respectively, sodium and potassium. Thermodynamic relationships relating the phase diagram to the measured equilibrium pressures have been developed. The classical shape of the pressure-temperature curves, even for the pure compound, as well as mixtures of the two components, indicates a dependency on liquidus and eutectic melting. Vapor pressure measurements were also carried out over that composition of the ternary which could be of interest for the recovery of zirconium metal by fused salt electrolysis. From these data, the activities and the other partial molar properties of the components in solution were calculated for both the M2ZrCl6 and ZrCl4 species. (Author)

AD-627 216 Fld. 7/4, 10/3
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
A STUDY OF ELECTRODES AND ELECTRODE REACTIONS: II. THE RELATION OF THE ENERGY NECESSARY TO REMOVE AN OXYGEN MOLECULE FROM CHARGED NICKEL OXIDE ELECTRODES IN VACUA AND SOLUTIONS OF POTASSIUM HYDROXIDE.
Technical rept.,
by Benjamin C. Bradshaw. Dec 65, 31p. Rept. no. ECOM-2646
Proj. DA-1C0-14501-A-34A Task 1C0-14501-A-34A-00-01

Unclassified report

See also AD-627 248.

Descriptors: (*Electrodes, Chemical reactions), (*Oxygen, Electrochemistry), (*Nickel compounds, Oxides), Crystals, Decomposition, Reaction kinetics, Energy, Vacuum, Electrolytes, Potassium compounds, Hydroxides, Electrolysis, Oxidation-reduction reactions, Alkaline cells

The energies that are necessary to remove oxygen from charged nickel oxide electrodes that are in solutions of potassium hydroxide at 25C were calculated. The 21 and 24 kilo calories that are necessary to release one mole of oxygen into potassium hydroxide solutions agree with the 21 and 24 kilo calories that are necessary to release it into vacua. The evolution of oxygen from charged nickel oxide electrodes into vacua obeys the equation describing first-order reactions, and seems to result from the simple decomposition of the higher oxides of nickel. The evolution of oxygen obeys the same equation with the same specific reaction rates when the electrodes are in solutions of potassium hydroxide that are saturated with oxygen. Therefore, it was concluded that the reduction of the higher oxides of nickel results from a simple decomposition in both, that the rate of reoxidation of the lower oxides of nickel is negligible, and that the energy of activation for this reoxidation is large relative to kT. The variation of the electromotive force is calculated as a function of the variation of the ratio of the concentrations of the oxidized and reduced nickel ions that are on the surface of the electrodes. (Author)

AD-627 234 Fld. 7/4, 20/3, 20/6
CFSTI Prices: HC $7.00 MF $1.75
LEICESTER UNIV (ENGLAND)
THE EFFECT OF ADDED ELECTROLYTES ON THE ELECTRON SPIN RESONANCE AND OPTICAL ABSORPTION OF SOLUTIONS OCE AND OPTICAL ABSORPTION OF SOLUTIONS OF THE ALKALI METALS IN LIQUID AMMONIA.
Final rept.,
by Ronald Catterall. Apr 64, 345p. Contract AF-EOAR-62-64 Proj. AF-9710 Task 971001 AFOSR 65-1938-Pt-2

Unclassified report

Doctoral thesis. See also AD-609 557.

Descriptors: (*Metals, Solutions), (*Alkali metals, Solutions), (*Solutions, Physical properties), Electrolytes Amines, Electron spin resonance, Optical properties, Absorption ethers, Liquefied gases, Ammonia, Electrical conductance, Mechanical properties, Magnetic properties, Nuclear magnetic resonance, Mathematical models, Alkali metal compounds, Great Britain

This is an informative annex to the final report AFOSR-65-1938, pt. 1. A review of the development of the study of metal solutions is presented. Particular emphasis is placed on the various models proposed to describe the physical properties of these solutions. Electron spin resonance and optical absorption measurements are reviewed in detail. (Author)

AD-627 237 Fld. 7/4, 11/2
CFSTI Prices: HC $1.00 MF $0.50
ARMY MATERIALS RESEARCH AGENCY WATERTOWN MASS MATERIALS ENGINEERING DIV
INFRARED RADIATION OF SOLIDS - TITANIUM-BORONITRIDE,
by Albert F. Grenis, and Albert P. Levitt. Dec 65, 16p. Rept. no. AMRA-TR-65-30
Proj. DA-1A014501B32A

Unclassified report

Descriptors: (*Ceramic materials, Spectra (Infrared)), (*Spectra (Infrared), Ceramic materials), Composite materials, Titanium, Boron compounds, Nitrides, Infrared phenomena, Emissivity, Solid state physics, Thermal radiation, Theory, High-temperature research, Molecular properties, Molecular weight, Blackbody radiation, Titanium compounds

The infrared radiation properties and characteristics of titanium-boronitride were investigated in the wavelength region extending from 1.0 to 10.0 microns at a temperature of 1300 K. The normal spectral emissivity, integrated normal total emissivity, and infrared radiation intensity curves of this material for two different surface conditions were determined. Additional radiation studies were made using a mathematical interpretation based on the normal total emissivity and weight-to-density ratios of the individual constituents. (Author)

AD-627 248 Fld. 7/4, 10/3
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
A STUDY OF ELECTRODES AND ELECTRODE REACTIONS: I. THE ENERGY NECESSARY TO REMOVE AN OXYGEN MOLECULE FROM A CHARGED NICKEL OXIDE ELECTRODE IN A VACUUM.
Technical rept.,
by Benjamin C. Bradshaw. Oct 65, 22p. Rept. no. ECOM-2637
Proj. DA-1C0 14501 A34A Task 1C0 14501 A 34A 00

Unclassified report

Descriptors: (*Electrodes, Chemical reactions), (*Oxygen, Electrochemistry), (*Nickel compounds, Oxides), Crystals, Vacuum, Energy, Surfaces, Electrolysis, Alkaline cells

The energies that are necessary to remove oxygen from the crystals that are on the surface of charged nickel oxide electrodes were calculated from the rates of evolution of oxygen from their surfaces into a vacuum. These energies increase in steps of about three kilo calories; this rate of increase is nearly the same as Bradshaw and Shuttleworth (Phys. Rev. v94 p753 1954) found for the physisorption of inert gases on the surface of various crystals. The energies of attachment of the oxygen to the nickel oxide crystals were used to calculate the half lives of the oxides on the surface of the charged nickel oxide electrodes. (Author)

AD-626 662 See Fld. 20/6

AD-626 670 See Fld. 20/12

AD-626 702 See Fld. 19/4

AD-626 746 See Fld. 20/3

AD-626 805 See Fld. 7/2

AD-626 866 See Fld. 20/12

AD-626 906 See Fld. 4/1

AD-627 059 See Fld. 20/12

AD-627 215 See Fld. 10/3

AD-627 221 See Fld. 7/2

AD-627 222 See Fld. 7/2

AD-627 238 See Fld. 20/12

7/5. RADIO AND RADIATION CHEMISTRY

AD-626 784 Fld. 7/5, 6/1
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMISTRY
INTERMOLECULAR QUENCHING OF A HIGHER EXCITED STATE OF CHLOROPHYLL A BY BETACAROTENE,
by T. G. Truscott, Meyer Chessin, and Robert Livingston. 14 Jun 65, 2p. Contract AT (11-1)-794 ,DA-ARO (D)-31-124-G603
AROD 2397:6

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n9 p3409-10 Nov 1 1965. Copies to DDC users only.

Descriptors: (*Chlorophyll, Fluorencence), (*Fluorescence, Quenching (Inhibition)), (*Carotenoids, Quenching (Inhibition)), Molecular energy levels, Excitation, Organic solvents, Complex compounds

Data are presented which indicate that, despite reports to the contrary, there is no quenching of chlorophyll a in its higher excited fluorescent state by beta-carotene.

AD-626 924 Fld. 7/5, 7/3
TULANE UNIV NEW ORLEANS LA DEPT OF CHEMISTRY
FORMATION OF PHENYLCARBENES BY PHOTOLYSIS OF PHENYLOXIRANES,
by H. Kristinsson, and G. W. Griffin. 2 Jul 65, 2p. Contract DA-31-124-ARO (D)-182
AROD 4375:6

Unclassified report

Availability: Published in Angewandte Chemie, v4 n10 p868 1965. Copies to DDC users only.

Descriptors: (*Aromatic compounds, Synthesis (Chemistry)), (*O-heterocyclic compounds, Photolysis), Cyclopropanes, Free radicals, Decomposition

A mixture of cis- and trans-2,2,3-trimethyl-1phenylcyclopropane was obtained on photolysis of triphenyloxirane in either 2-methylbut-2-ene/benzene or 2-methylbut-2-ene alone. However, the main products were tetraphenylethane and the oxetane. These reactions apparently all involve a diradical, which decomposes preferentially to the carbene plus the carbonyl compound. Photolysis of tetraphenyloxirane in methanol/benzene given benzhydrol methyl ether in almost 100% yield.

AD-626 937 Fld. 7/5
CFSTI Prices: HC $2.00 MF $0.50
MONSANTO RESEARCH CORP EVERETT MASS BOSTON LAB
CHEMILUMINESCENT SYSTEMS.
Technical rept.
20 Jan 66, 27p. Rept. no. MRB-3009Q6 ,TR-6
Contract Nonr-4511 (00) ,ARPA Order-299 Proj. NR-356-464

Unclassified report

See also AD-622 503.

Descriptors: (*Chemiluminescence, Organic materials), (*Indoles, Chemiluminescence), (*Catalysis, Chemiluminescence), Emissivity, Ion exchange resins, Oxidation, Solvents, Acetophenones, *Fluorescence, Formamides, Continuous spectrum, Quantum statistics, Brightness, Odors, Aldehydes, Peroxides

The objective of this research is the discovery of bright, chemiluminescent reactions suitable for development into practical field systems. In this report, we discuss the heterogeneous catalysis of chemiluminescence, and we describe the emitting state in skatole chemiluminescence. An apparatus is described which was designed for the investigation of chemiluminescence enhancement by solid state catalysis. While the autoxidation of lucigenin on silica gel was non-chemiluminescent, the chemiluminescence from skatole on 5A molecular sieves appears promising. The emitting species in the skatole chemiluminescent reaction has been identified. The autoxidation of skatole in DMSO/t-BuOK has been shown to proceed to o-formidoacetophenone anion (FAP) in high yield. The fluorescence of FAP matches the chemiluminescence emission spectrum of skatole in emission peak and contour. This identification confirms, for the more important skatole system, the identification of an emittor analogous to that previously identified in the 2,3-dimethylindole system. Analysis of the previously reported substituent effects led us to synthesize several 5-substituted skatoles in an attempt to improve the overall quantum efficiency. The materials were found to be quite similar to skatole in both efficiency and brightness, but were, however, odorless. Several factors influencing the quantum yield are discussed.

AD-626 745 See Fld. 7/4

AD-626 925 See Fld. 7/3

AD-627 024 See Fld. 7/2

AD-627 026 See Fld. 20/8

AD-627 027 See Fld. 20/8

AD-627 233 See Fld. 20/5

Field 8-EARTH SCIENCES AND OCEANOGRAPHY

8/1. BIOLOGICAL OCEANOGRAPHY

AD-627 256 See Fld. 8/3

8/2. CARTOGRAPHY

AD-626 708 Fld. 8/2, 8/6
CFSTI Prices: HC $1.00 MF $0.50
ASSISTANT CHIEF OF STAFF FOR INTELLIGENCE (ARMY) WASHINGTON D C
THE CONTENT AND COMPILATION OF CADASTRAL MAPS OF THE LAND OF ADMINISTRATIVE AREAS,
by S. V. Golovenko, L. I. Gorbunova, and T. N. Leonova. 5 Jan 66, 4p.
TT 66-60271

Unclassified report

Soderzhanie i Sostavlenie Kadastrovykh Kart Zemel Administrativnykh Raionov, Moscow Univ. Vestnik (USSR) n2 1964.

Descriptors: (*Mapping, USSR), Geography, Maps, Soils, Agriculture

AD-626 790 Fld. 8/2, 11/9
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
USE OF TRANSPARENT PLASTICS IN STEREOTOPOGRAPHIC PROCESSING,
by M. A. Blyumin. 1965, 8p. Rept. no. FSTC-381-T65-620
TT 66-60282

Unclassified report

Trans. of Geodeziya i Kartografiya (USSR) p49-52 Jul 1964.

Descriptors: (*Mapping, Plastics), (*Plastics, Mapping), Aerial photographs, Photographic techniques, Stereoscopic photography, Processing, Aerial photography, Photographic recording media, USSR

The paper presents a short description of the technology involved in the use of plastics for stereotopographic processing and restoring of maps. Three types of processing may be done with plastics in the composition of topographic maps on conventional equipment: direct engraving of the original on the engraving layer of a plastic in steps according to the composition of the map from different elements (topography, contours, hydrography); engraving of the complete original (without separation into steps); production of the complete map serving as master for engraving of the original. Completed operations showed that with a khostafan plastic sheet it is possible to obtain original maps of a 3rd-4th degree of difficulty. When the more transparent astrolan plastic is used, it is possible to use this method in the preparation of maps of higher degrees of difficulty. It is best to use transparent plastics in the composition of photographic layouts for the production of maps of flat regions. Experimental studies of the preparation of the photographic layout on transparent plastics by means of a rinsed relief were carried out. It is known that according to these techniques only striated copies can be obtained on the gelatinous layer. To obtain a half-tone original, such as a photographic layout, a 72 l/mm screen was used through which images were printed by the contact method from the half-tone negative onto the gelatinous, color-sensitive layer applied to the plastic.

AD-626 949 Fld. 8/2
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
RESULTS OF EXPERIMENTAL WORK ON DESIGN OF PHOTOGRAMMETRIC NETWORKS ON GENERALPURPOSE INSTRUMENTS,
by N. A. Sokolov, K. N. Gertsenova, and A. G. Vanin. Dec 65, 21p. Rept. no. FSTC-381-T65-672
TT 66-60307

Unclassified report

Trans. of Geodeziya i Kartografiya (USSR) n5 p28-41 May 1964.

Descriptors: (*Photogrammetry, USSR), Aerial photography, Surveying, Position finding, Geodesics, Instrumentation

8/3. DYNAMIC OCEANOGRAPHY

AD-626 809 Fld. 8/3
CFSTI Prices: HC $4.00 MF $0.75
TEXAS A AND M UNIV COLLEGE STATION DEPT OF OCEANOGRAPHY AND METEOROLOGY
THE NON-LINEAR RESPONSE OF A TWO-LAYER, BAROCLINIC OCEAN TO A STATIONARY, AXIALLYSYMMETRIC HURRICANE.
Technical rept. 15 May-31 Dec 65,
by James J. O'Brien. Dec 65, 112p. Rept. no. Ref-65-34T
Contract Nonr-2119 (04) Proj. Texas A/M-286-1

Unclassified report

Descriptors: (*Ocean waves, Tropical cyclones), (*Tropical cyclones, Ocean waves), Marine meteorology, Ocean currents, Hydrodynamics, Mathematical models, Nonlinear systems

This study is concerned with the theoretical description of upwelling and mixing induced in a stratified, rotating two-layer ocean by momentum transfer from an intense stationary, axially-symmetric atmospheric vortex. A general model is derived which leads to a hierarchy of models of increasing complexity. The mechanisms of energy transfer to and from the atmosphere and to and from the lower layer are examined in detail. Results agree qualitatively with observations taken in the Gulf of Mexico following hurricane Hilda, 1964. Intense upwelling is confined to within twice the radius of maximum winds. The displaced warm central waters produce some downwelling adjacent to the upwelled region. Turbulent mixing of heat and salt modifies the density structure throughout the wind-forced region of the ocean. The degree of upwelling is time-dependent and the hurricane-force winds must act on the ocean for several hours before significant upwelling occurs. In a special model it is shown that the configuration of the upwelled region becomes quasi-stationary when the hurricane-force winds are removed from the system. (Author)

AD-627 256 Fld. 8/3, 8/10, 8/1
CFSTI Prices: HC $2.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
METHODS AND INSTRUMENTS OF OCEANOLOGICAL RESEARCH,
by V. A. Shirey. 1965, 43p. Rept. no. Translation-988
TT 66-60403

Unclassified report

Methodika Rabot s Yakorniymi Buikoviimi Stantsiiami, trans. of Akademiya Nauk SSSR. Institut Okeanologii. Trudy, v55 p3-22 n. d.

Descriptors: (*Oceanology, USSR), (*Oceanographic equipment, USSR), Ocean currents, Measurement, Buoys, Temperature sensitive elements, Television communication systems, Underwater oommunication systems, Mediterranean Sea

Contents: Methods of ocean current measurement with anchor-type buoy stations; deep water photo thermograph; the study of the bottom of the Mediterranean Sea with the help of an underwater television set.

AD-626 706 See Fld. 4/2

AD-626 904 See Fld. 8/10

8/4. GEOCHEMISTRY

AD-627 015 Fld. 8/4, 3/1
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
EQUALIZATION OF COSMIC SPATIAL TRIANGULATION IN A SYSTEM OF RECTANGULAR GEOCENTRIC COORDINATES,
by B. M. Klenitskii, and G. A. Ustinov. Dec 65, 21p. Rept. no. FSTC-381-T65-676
TT 66-60355

Unclassified report

Trans. of Geodeziya i Kartografiya (USSR) n5 p3-16 May 1964.

Descriptors: (*Astronomical geodesics, Satellites (Artificial)), (*Satellites (Artificial), Astronomical geodesics), USSR

AD-627 070 Fld. 8/4, 3/1
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ADJUSTMENT OF SPACE TRIANGULATION,
by G. A. Ustinov. 20 Dec 65, 15p. Rept. no. FTD-TT-65-1190
TT 66-60360

Unclassified report

Unedited rough draft trans. of Nablyudeniya Iskusstvennykh Sputnikov Zemli (USSR) n2 p19-24 1963.

Descriptors: (*Astronomical geodesics, Satellites (Artificial)), (*Satellites (Artificial), Astronomical geodesics), Corrections, Least squares method, USSR

AD-626 795 See Fld. 9/2

8/6. GEOGRAPHY

AD-626 710 Fld. 8/6
CFSTI Prices: HC $1.00 MF $0.50
ASSISTANT CHIEF OF STAFF FOR INTELLIGENCE (ARMY) WASHINGTON D C
CHRONICLE. SECOND INTERDEPARTMENTAL SCIENTIFIC CONFERENCE ON THE PROBLEMS OF EASTERN UKRAINE (KHRONIKA. VTORAYA MEZHVEDOMSTVENNAYA NAUCHNAYA KONFERENTSIYA PO PROBLEMAM LEVOBERZHNOI UKRAINII),
by I. V. Nikolskii, and L. I. Grishina. 1965, 4p.
TT 66-60273

Unclassified report

Trans. of Moscow Univ. Vestnik (USSR) n2 1964.

Descriptors: (*Geography, USSR), Economics, Industries, Natural resources

The conference dealt with the development and distribution of industry in the Donets-Dneprovsk Economic' Region, the prospective development of the chemical industry in Eastern Ukraine, the total electrification of the Ukrainian SSR, and the further study and industrial utilization of the mineral base in the Black Sea Economic Region.

AD-626 711 Fld. 8/6
CFSTI Prices: HC $1.00 MF $0.50
ASSISTANT CHIEF OF STAFF FOR INTELLIGENCE (ARMY) WASHINGTON D C
GEOGRAPHY OF THE PEOPLE OF EASTERN SIBERIA (GEOGRAFIYA NASELENIYA VOSTOCHNOI SIBIRI),
by B. S. Khorev. 1965, 2p.
TT 66-60274

Unclassified report

Trans. of Akademiya Nauk SSSR. Sibirskoe Otdelenie. Izvestiya, n5 Seriya Obshchestvennykh Nauk, n2 p133-4 1964.

Descriptors: (*Geography, Siberia), (*Siberia, Geography), Population

AD-626 712 Fld. 8/6, 5/7
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE ARMY WASHINGTON D C
ON THE GEOGRAPHIC NAMES OF THE CIS-BAYKAL AND THE TRANS-BAYKAL,
by B. V. Bashkuev. 5 Jan 66, 10p. Rept. no. i-8785
TT 66-60275

Unclassified report

O Geograficheskikh Nazbaniyakh Predbaikalya i Zabaikalya, trans. of Vsesoyuznoe Geograficheskoe Obshchestvo. Izvestiya (USSR) n4 p346-52 1965.

Descriptors: (*Geography, USSR), (*Linguistics, USSR), Population, Culture

AD-626 713 Fld. 8/6, 13/2
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE ARMY WASHINGTON D C
MOSCOW, THE CAPITAL OF OUR HOMELAND,
by Iv. Kirillov. 6 Jan 66, 8p. Rept. no. i-5872A
TT 66-60276

Unclassified report

Moskva, Stolitsa Nashei Rodiny, trans. of Geografiya v Shkole (USSR) n2 p8-15 1964.

Descriptors: (*Urban areas, USSR), Geography, History, Government (Foreign), Economics, Industries, Communism, Population, Culture, Transportation, Underground structures, Housing, Urban planning

AD-626 716 Fld. 8/6, 5/3
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE ARMY WASHINGTON D C
GEOGRAPHIC NEWS.
6 Jan 66, 8p. Rept. no. i-5872D
TT 66-60279

Unclassified report

Geograficheskie Novosti, trans. of Geografiya v Shkole (USSR) n2 p70-4 1964.

Descriptors: (*Industrial production, USSR), Industrial plants, Geography, Steel, Electric power production, Petroleum industry, Chemical industry, Agriculture, Inland waterways, Economics

AD-626 706 **See Fld. 4/2**

AD-626 708 **See Fld. 8/2**

AD-626 714 **See Fld. 5/3**

AD-626 715 **See Fld. 5/3**

AD-627 090 **See Fld. 4/2**

8/7. GEOLOGY AND MINERALOGY

AD-627 002 Fld. 8/7, 8/11
CFSTI Prices: HC $4.00 MF $0.75
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS TERRESTRIAL SCIENCES LAB
BIBLIOGRAPHY OF EXPERIMENTAL ROCK DEFORMATION, SECOND EDITION.
Special repts.,
by R. E. Riecker, H. L. Cook, and D. L. Pendleton. Oct 65, 114p. Rept. no. SR-35
Proj. AF-7639 Task 763905
AFCRL 65-740

Unclassified report

Descriptors: (*Engineering geology, Bibliographies), (*Rock (Geology), Deformation), (*Seismology, Bibliographies), Geophysics, Minerals, Petrology

A bibliography of over 1000 rock deformation research articles published in scientific journals and books is presented with both subject and author entries. The cross-referenced subject listings include the following major categories: Apparatus, Brittle Behavior, Calcite, Calibration, Conductivity, Creep, Dislocations, Dolomite, Ductile Behavior, Elastic Behavior and Elastic Constants, Fabric, Friction, General, Ice, Marble, Olivine, Phase Studies, Quartz, Recrystallization, Resistance, Safety, Sedimentary Rocks, Seismic Velocities, Shear, Shock, Strain Rate, Surveys, Viscosity, X-ray. (Author)

AD-627 053 Fld. 8/7
CFSTI Prices: HC $1.00 MF $0.50
DIRECTORATE OF SCIENTIFIC INFORMATION SERVICES OTTAWA (ONTARIO)
PALEOMAGNETIC STUDIES OF THE LAVAS OF AVACHA VOLCANO (KAMCHATKA),
by A. P. Gorshkov, V. V. Kochequra, and G. S. Shteinberg. Aug 65, 12p. Rept. no. T-431-R
TT 66-60357

Unclassified report

Trans. from mono. Rock Magnetism and Paleomagnetism, Krasnoyarsk, 1963 p267-78.

Descriptors: (*Volcanoes, USSR), Igneous rocks, Terrestrial magnetism, Geologic age determination, Geology

The basic task of the paleomagnetic studies made, in 1961, of Avacha Volcano (Avachinskaya Sopka) was to ascertain its age.

AD-627 127 Fld. 8/7, 8/14
CFSTI Prices: HC $1.00 MF $0.50
DIRECTORATE OF SCIENTIFIC INFORMATION SERVICES OTTAWA (ONTARIO)
METHOD OF SELECTING ORIENTATED SAMPLES FROM IRREGULARLY BEDDED ROCKS FOR PALEOMAGNETIC STUDIES,
by V. V. Krugliakov. Aug 65, 3p. Rept. no. T-432-R
TT 66-60380

Unclassified report

Trans. of mono. Rock Magnetism and Paleomagnetism, Krasnoyarsk, 1963 p425-7.

Descriptors: (*Sedimentary rock, Magnetic properties), (*Stratigraphy, Terrestrial magnetism), (*Terrestrial magnetism, Stratigraphy), Sedimentation, Petrology, USSR

AD-626 825 **See Fld. 8/10**

AD-626 868 **See Fld. 20/2**

AD-627 020 **See Fld. 8/11**

AD-627 160 **See Fld. 8/10**

8/8. HYDROLOGY AND LIMNOLOGY

AD-626 709 Fld. 8/8
CFSTI Prices: HC $1.00 MF $0.50
ASSISTANT CHIEF OF STAFF FOR INTELLIGENCE (ARMY) WASHINGTON D C
SCIENTIFIC NOTES, THE MUDFLOW ON THE ISSYK RIVER ON 7 JULY 1963,
by S. P. Kavetskii, and E. M. Kalmykina. 5 Jan 66, 7p.
TT 66-60272

Unclassified report

Nauchnye Zametki, Selna Reke Issyk Yulya 1963 goda, Moscow Univ. Vestnik (USSR) n2 1964.

Descriptors: (*Rivers, USSR), Fluid flow, Mud, Sedimentation, Hydrology

AD-627 130 **See Fld. 8/12**

8/10. PHYSICAL OCEANOGRAPHY

AD-626 825 Fld. 8/10, 8/7
SCRIPPS INSTITUTION OF OCEANOGRAPHY UNIV OF CALIFORNIA LA JOLLA
A SYMPOSIUM ON CONTINENTAL DRIFT. X. THE WORLD-WIDE OCEANIC RISE-RIDGE SYSTEM,
by H. W. Menard. 7 Jan 66, 16p. Contract Nonr-2216 (23) Proj. NR-083-005

Unclassified report

Availability: Published in Philosophical Transactions of the Royal Society v258 p109-22 1965. Copies to DDC users only.

Descriptors: (*Orogeny, Ocean bottom topography), (*Ocean bottom topography, Orogeny), Marine geology, Marine geophysics, Structural geology

About half the length of the 'oceanic' rise-ridge system is centred in ocean basins. On the other hand, almost the whole system is approximately disposed in circles around continental shields. Exceptional heating of the system is indicated by high heat flow and the extrusion of extraordinary volumes of flood basalts. The concentration of volcanoes, however, is little greater than normal for ocean basins. Longitudinal normal faulting and transverse wrench faulting are characteristic of the system. Both types formed early in the life of the system and are still active. Wrench faults offset belts of normal faulting and the crests of rises and ridges in many places but are not themselves known to be offet by normal faults. The ancient Darwin Rise has subsided in the southwestern Pacific. Its history differs in some respects from other rises although it too was heated and faulted. A hypothesis or origin of the system is breifly discussed. (Author)

AD-626 875 Fld. 8/10
SCRIPPS INSTITUTION OF OCEANOGRAPHY UNIV OF CALIFORNIA LA JOLLA
IGNEOUS ROCKS OF THE INDIAN OCEAN FLOOR,
by Celeste G. Engel, Robert L. Fisher, and A. E. J. Engel. 20 Aug 65, 8p. Contract Nonr-2216 (23) Proj. NR-083-005

Unclassified report

Availability: Published in Science v150 n3696 p605-10 29 Oct 1965. Copies to DDC users only.

Descriptors: (*Igneous rocks, Indian Ocean), (*Indian Ocean, Igneous rocks), Petrology, Geochemistry, Marine geology, Ocean bottom topography

Four dredge hauls from near the crest and from the eastern flank of the seismically active Mid-Indian Ocean Ridge at 23 to 24 S, at depths of 3700 to 4300 meters, produced only low-potassium tholeiitic basalt similar in chemical and mineralogic composition to basalts characteristic of ridges and rises in the Atlantic and Pacific oceans. A fifth haul, from a depth of 4000 meters on the lower flank of a seamount on the ocean side of the Indonesian Trench, recovered tholeiitic basalt with higher concentrations of K and Ti and slightly lower amounts of Si and Ca than the typical oceanic tholeiite of the ridge. The last sample is vesicular, suggesting depression of the area since the basalt was emplaced. Many of the rocks dredged are variously decomposed and hydrated, but there is

no evidence of important chemical modification toward conversion of the lava flows to spilite during extrusion or solidification. (Author)

AD-626 904 Fld. 8/10, 8/3
SCRIPPS INSTITUTION OF OCEANOGRAPHY UNIV OF CALIFORNIA LA JOLLA
INTERMEDIATE WATERS OF THE PACIFIC OCEAN,
by Joseph L. Reid,Jr.. 1965, 83p. Rept. no. JHU Oceanographic Studies-2
Contract NSF-G2935
Unclassified report

Sponsored in part by ONR.

Availability: Johns Hopkins Press, Baltimore, Md., HC $8.50.

Descriptors: (*Pacific Ocean, Oceanographic data), (*Oceanology, Pacific Ocean), Maps, Graphics

AD-627 128 Fld. 8/10
CFSTI Prices: HC $1.00 MF $0.50
DIRECTORATE OF SCIENTIFIC INFORMATION SERVICES OTTAWA (ONTARIO)
OCEANIC RIDGES AND RIFT STRUCTURE. GEOLOGICAL NATURE OF THE MAGNETIC AND GRAVITY ANOMALIES OVER THE RIFT VALLEY,
by A. G. Komarov. Nov 65, 8p. Rept. no. T-437-R
TT 66-60381
Unclassified report

Trans. of Priroda (USSR) v54 n7 p95-8 1965.

Descriptors: (*Atlantic Ocean, Ocean bottom topography), (*Orogeny, Ocean bottom topography), (*Marine geology, Orogeny), Marine geophysics, Geodesics, Gravity, Terrestrial magnetism, Structural geology, USSR

Magnetic surveys and gravity measurements are made of the Mid-Atlantic Ocean Ridge.

AD-627 151 Fld. 8/10
CFSTI Prices: HC $1.00 MF $0.50
NAVAL OCEANOGRAPHIC OFFICE WASHINGTON D C
THE COEFFICIENT OF TURBULENT HEAT EXCHANGE IN THE SURFACE LAYER OF THE BLACK SEA,
by Z. S. Ivanova. 1965, 18p. Rept. no. TRANS-263
TT 66-60382
Unclassified report

Koeffitsient Turbulentnogo Obmena Tepla v Poverkhnostnom Sloie Chernogo Morya, trans. of Akademiya Nauk SSSR. Morskoi Gidrofizicheskii Institut. Trudy, v13 p54-64 1958.

Descriptors: (*Black Sea, Heat transfer), (*Oceanology, Black Sea), Bathythermograph data, Surface area, Transport properties, Turbulence, Marine meteorology, USSR

The paper discusses the calculation and verification of the coefficient of turbulent temperature conductively, K sub z, in surface water layers of the Black Sea to a depth of 50m. The calculations are based on observational data obtained by Yuliy Shokal'skiy observations in the Black Sea by the end of 1954, and by the Black Sea Oceanographic Expedition of 1923 - 1926. It appeared that in the upper layer, to a depth of 15-18m, the K sub z value decreases with depth in accordance with exponential law, but in the underlying layer from 18 to a depth of 50m, the value increases with depth in accordance with the linear law. At the surface K sub z equals 15-25 abs. units, at the depth of 15-18m it is 0.5-0.6 abs. units and at the depth of 50m it is 6.5-7.5 abs. units. By comparing the observed and calculated amplitudes and phase displacements of temperature waves it appeared that the best agreement occurred when K sub z varies in accordance with a scheme calculated by the transformed Fjeldstad method. (Author)

AD-627 160 Fld. 8/10, 8/7
SCRIPPS INSTITUTION OF OCEANOGRAPHY UNIV OF CALIFORNIA LA JOLLA
SEDIMENTOLOGY OF GUERREO NEGRO LAGOON, BAJA CALIFORNIA, MEXICO,
by Fred B. Phleger. 6 Jan 66, 35p. Contract Nonr-2216 (23) Proj. NR-083-005
Unclassified report

Availability: Published in Colston Papers, v17, Symposium of the Colston Research Society (17th), held at Bristol Univ. Apr 5-9 1965. Copies to DDC users only.

Descriptors: (*Sounds, Mexico), (*Mexico, Marine geology), (*Marine geology, Mexico), Sedimentation, Tidewater, Tides, Swamps, Beaches, Foraminifera

AD-627 256 **See Fld. 8/3**

8/11. SEISMOLOGY

AD-626 695 Fld. 8/11
LAMONT GEOLOGICAL OBSERVATORY PALISADES N Y
THE SEISMICITY OF THE CARIBBEAN REGION,
by Lynn R. Sykes, and Maurice Ewing. 6 Jul 65, 15p. Rept. no. Scientific-4 ,LGO-843
Contract AF19 (628)-4082 ,ARPA Order-292
Proj. AF-8652 Task 865201
AFCRL 65-909
Unclassified report

Availability: Published in Journal of Geophysical Research v70 n20 p5065-74 15 Oct 65. Copies to DDC users only.

Descriptors: (*Seismology, West Indies), Earthquakes, Structural geology, Marine geology, Caribbean Sea, Central America, South America

The hypocenters of approximately 500 Caribbean earthquakes were relocated using a digital computer. A nearly continous belt of shallow-focus seismicity can be traced from Central America to the Greater and Lesser Antilles and thence to northeastern Venezuela. In Venezuela intense sources of seismic activity are apparently associated with the El Pilar and Bocono fault zones. This study indicated a gap in the seismicity of northern South America. In addition to this area, several other segments of island arcs have acted as distinct tectonic units. Much of the shallow-focus activity in the vicinity of the Puerto Rico trench is located beneath the south wall of the trench. (Author)

AD-626 834 Fld. 8/11
CFSTI Prices: HC $1.00 MF $0.50
GEOLOGICAL SURVEY DENVER COLO
STUDY OF SEISMIC PROPAGATION PATHS AND REGIONAL TRAVELTIMES IN THE CONTINENTAL UNITED STATES.
Progress rept. for 31 Dec 65.
31 Dec 65, 3p. Contract arpa order-193-64 Proj. 8100
Unclassified report

Descriptors: (*Seismology, Structural geology), Seismic waves, Propagation, United States

AD-627 020 Fld. 8/11, 8/7
CFSTI Prices: HC $7.00 MF $1.50
AIR FORCE WEAPONS LAB KIRTLAND AFB N MEX
THE GREAT ALASKA EARTHQUAKE. VOLUME II. ILLUSTRATIONS AND MAPS.
Rept. for 1 May-1 Oct 64,
by Walter E. Fisher, and Douglas H. Merkle.
Nov 65, 324p. Rept. no. AFWL-TR-65-92-vol-2 Proj. AF-5713
Unclassified report

Descriptors: (*Earthquakes, Alaska), (*Alaska, Earthquakes), (*Seismology, Alaska), Damage, Photographs, Maps, Mechanical drawings

The Great Alaska Earthquake consists of the photographs, maps, and drawings which supplement Volume I of this report.

AD-627 038 Fld. 8/11, 17/10
CFSTI Prices: HC $3.00 MF $0.75
SAINT LOUIS UNIV MO INST OF TECH
MODEL STUDY OF EXPLOSION-GENERATED SEISMIC WAVES.
Final rept. 1 Oct 62-1 Oct 65,
by Carl Kisslinger. 1 Oct 65, 82p. Contract AF19 (628)-1689 ,ARPA Order-292-62 Proj. DA-8652 Task 86522
AFCRL 65-829
Unclassified report

Descriptors: (*Seismology, Underground explosions), Explosion effects, Seismic waves, Propagation, Models (Simulations), Nuclear explosions, Detection

The generation of seismic waves by an explosive source in homogeneous media was investigated by twodimensional models. The size of the effective source for compressional waves agrees well with the outer limits of the zone of circumferential cracking in a brittle medium. Prominent shear waves appear only when the source produces long radial cracks, is located near the free surface of the model, or the source is elongated. The radiation of both types of body waves is strongly modified when the source is near the surface. The P-wave spectrum can be modified by surrounding the shot with a different material. A cavity, filled with air or a solid substance, affects the signal through both its geometric configuration and the properties of the material in the cavity. The evidence from Rayleigh waves indicates that the effect of an explosion changes from a vertically applied source pulse to a buried center of compression when the source depth exceeds the radius of the zone of nonelastic behavior. When the medium is statically stressed before the shot, the body waves are modified. A low velocity wedge modifies wave propagation by creating a shadow zone. Diffractions into this shadow zone from the wedge tip were observed. (Author)

AD-627 039 Fld. 8/11, 17/10
CFSTI Prices: HC $2.00 MF $0.50
UED EARTH SCIENCES DIV TELEDYNE INC ALEXANDRIA VA
LONG RANGE SEISMIC MEASUREMENTS. BRONZE.
Scientific rept.,
by Don M. Clark. 3 Dec 65, 34p. Rept. no. Seismic DLR-132
Contract AF33 (657)-12447 ,ARPA Order-624
Proj. VELA-T/2037
Unclassified report

Descriptors: (*Seismology, Nuclear explosions), (*Nuclear explosions, Seismology), (*Detection, Seismology), Seismic waves, Underground explosions, Earthquakes, Identification systems, Test facilities, Nevada

An analysis of seismological data from an underground nuclear explosion as a continuing study to provide information to aid in distinguishing between earthquakes and explosions. A table of travel-times and amplitudes of P, Pg, Lg, and surface waves are included along with other unidentified phases. (Author)

AD-627 040 Fld. 8/11, 17/10
CFSTI Prices: HC $2.00 MF $0.50
UED EARTH SCIENCES DIV TELEDYNE INC ALEXANDRIA VA

LONG RANGE SEISMIC MEASUREMENTS. KLICKITAT.
Scientific rept.,
by Don M. Clark. 24 Nov 65, 34p. Rept. no. Seismic-DLR-131
Contract AF33 (657)-12447 ,ARPA Order-624
Proj. VELA-T/2037

Unclassified report

Descriptors: (*Seismology, Nuclear explosions), (*Nuclear explosions, Seismology), (*Detection, Seismology), Seismic waves, Underground explosions, Earthquakes, Identification systems, Test facilities, Nevada

An analysis of seismological data from an underground nuclear explosion as a continuing study to provide information to aid in distinguishing between earthquakes and explosions. A table of travel-times and amplitudes of P, Pg, Lg, and surface waves are included along with other unidentified phases. (Author)

AD-627 051 Fld. 8/11, 17/10
CFSTI Prices: HC $2.00 MF $0.50
UED EARTH SCIENCES DIV TELEDYNE INC ALEXANDRIA VA
LONG RANGE SEISMIC MEASUREMENTS. TURF.
Seismic data laboratory rept.,
by Don M. Clark. 12 Nov 65, 33p. Rept. no. 130
Contract AF33 (657)-12447 ,ARPA Order-624
Proj. VELA-T/2037

Unclassified report

Descriptors: (*Seismology, Nuclear explosions), (*Nuclear explosions, Seismology), (*Detection, Seismology), Underground explosions, Earthquakes, Seismic waves, Identification systems, Test facilities, Nevada

An analysis of seismological data from an underground nuclear explosion as a continuing study to provide information to aid in distinguishing between earthquakes and explosions. A table of travel-times and amplitudes of P, Pg, Lg, and surface waves are included along with other unidentified phases. (Author)

AD-627 096 Fld. 8/11
CFSTI Prices: HC $4.00 MF $0.75
AIR FORCE WEAPONS LAB KIRTLAND AFB N MEX
THE GREAT ALASKA EARTHQUAKE, VOLUME I.
Rept. for 1 May-1 Oct 64,
by Walter E. Fisher, and Douglas H. Merkle.
Nov 65, 110p. Rept. no. AFWL-TR-65-92-Vol-1
Proj. AF-5713

Unclassified report

Descriptors: (*Alaska, Earthquakes), (*Earthquakes, Alaska), (*Seismology, Alaska), Disasters, Damage, Structures, Geology, Civil engineering

The tremendous Alaska earthquake of March 1964 killed many people and caused property damage in the millions. Nevertheless this quake provided scientists and engineers with an almost unique opportunity to study the effects of so huge a natural phenomenon in a relatively urban and built-up environment. The coastal location of the quake's epicenter created a wide variety of temblor effects including crevasses or grabens, pressure ridges produced by landslides, and a broad spectrum of structural damage. The bays, inlets, harbors, and the seacoast for many hundreds of miles were inundated by powerful seismic sea waves (tsunamis). Such diverse effects suggested unlimited areas of study and evaluation. This technical report presents a general summary of all the effects catalogued above, and investigates in some detail the strengths and weaknesses of the many types of structures affected by the temblors. The volume of illustrations which supplement this report shows many details of structural damage, information that could be extremely useful to engineers, architects, contractors, city planners, and others who plan to erect structures on land known to be subject to earthquakes. All maps and illustrations are contained in Volume II (AD-627 020) of this report. (Author)

AD-627 131 Fld. 8/11
LAMONT GEOLOGICAL OBSERVATORY PALISADES N Y
THE USE OF LEAKING MODES IN SEISMOGRAM INTERPRETATION AND IN STUDIES OF CRUSTMANTLE STRUCTURE,
by Sergio S. Su, and James Dorman. 22 Mar 65, 31p. Contract DA-31-124-ARO (D)-136 ,AF19 (619)-7376 Proj. VELA-UNIFORM
AROD 4120:3

Unclassified report

Availability: Published in Bulletin of the Seismological Society of America v55 n6 p989-1021 Dec 1965. Copies to DDC users only.

Descriptors: (*Seismology, Structural geology), (*Structural geology, Sismology), Seismic waves, Propagation, Lithosphere

Certain normally and inversely dispersed wave trains appearing in the interval between P and S at moderate epicentral distances are identified as specific higher leaking modes. PL and shear-coupled PL data which are identified with the fundamental leaking mode were obtained for two paths in South America. Crustal thicknesses for the path between Buenos Aires and Rio determined independently from PL, shear-coupled PL and Rayleigh wave data agree well with one another. An analysis of the method of obtaining phase and group velocity curves consistent with the shear-coupled PL data shows that this method and this type of data together provide a high degree of precision for the determination of phase velocity curves. In the theoretical treatment, a rapid, approximate method, which is basically Haskell's (1962) method, was used to obtain dispersion curves for the leaking modes. The results of this method are virtually identical to those of Gilbert (1964) and those of Oliver and Major (1960). The main advantage of the present method is that it provides additional information on particle motion and on the relative amplitudes of the predicted arrivals as functions of phase velocity and period. (Author)

AD-627 169 Fld. 8/11
CALIFORNIA INST OF TECH PASADENA SEISMOLOGICAL LAB
A NOTE ON THE EXISTENCE OF RELATIVE MAXIMA AND MINIMA ON PHASE VELOCITY CURVES,
by E. N. Thrower, and D. G. Harkrider. 1 Mar 65, 4p. Contract AF49 (638)-1337

Unclassified report

Availability: Published in Bulletin of the Seismological Society of America v55 n6 p971-4 Dec 1965. Copies to DDC users only.

Descriptors: (*Seismology, Wave functions), Seismic waves, Propagation, Curve fitting

Phase and group velocity dispersion curves for fundamental Rayleigh waves have been computed with more precision that previously attempted. The new curves show a relative minimum in phase velocity at periods near 50 sec for four perturbed Gutenberg continental models. (Author)

AD-627 183 Fld. 8/11
CFSTI Prices: HC $1.00 MF $0.50
VELA SEISMIC INFORMATION ANALYSIS CENTER UNIV OF MICHIGAN ANN ARBOR
VESIAC MONTHLY BULLETIN OF VELA UNIFORM RESEARCH PUBLICATIONS.
15 Dec 65, 17p. Rept. no. VESIAC Bulletin no. 35

Unclassified report

Descriptors: (*Seismology, Bibliographies), Instrumentation, Geophysics, Geology, Earthquakes, Abstracts, Periodicals

Bibliography of abstracts pertaining to seismology.

AD-626 777 **See Fld. 17/10**

AD-627 002 **See Fld. 8/7**

8/12. SNOW, ICE, AND PERMAFROST

AD-626 704 Fld. 8/12
CFSTI Prices: HC $1.00 MF $0.50
DIRECTORATE OF SCIENTIFIC INFORMATION SERVICES OTTAWA (ONTARIO)
EXPERIMENTAL DETERMINATION OF THE SPEED OF ICE MOVEMENT WITHIN A GLACIER BY GEOPHYSICAL METHODS,
by B. A. Borovinskii. Dec 65, 7p. Rept. no. T-442-R
TT 66-60269

Unclassified report

Trans. of Akademiya Nauk Kazakhskoi SSR, Alma-Ata. Vestnik, v13 n12 (153) p56-60 1957.

Descriptors: (*Glaciers, Internal friction), Rheology, Geophysics, Surveying, USSR

The paper describes an attempt to determine the velocity of ice movement within a glacier by geophysical methods. The most applicable methods in this connection are those of electric surveying; those of magnetic surveying are more limited. In the present case both these methods were used to determine the velocities of movement of the internal ice-strata in the Central Tuyuksu glacier of the Trans-Ili Alatau.

AD-626 857 Fld. 8/12
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
ICE INTERFACE MORPHOLOGY AND TEXTURE DEVELOPED DURING FREEZING,
by J. D. Harrison, and W. A. Tiller. 31 May 63, 10p. Contract AF49 (638)-1029 Proj. AF-9761
Task 976102
AFOSR 65-1996

Unclassified report

Availability: Published in Journal of Applied Physics v34 n11 p3349-55 Nov 1963. Copies to DDC users only.

Descriptors: (*Ice, Phase studies), (*Freezing, Water), Solids, Liquids, Surface properties, Crystal structure

The freezing of pure water and several aqueous solutions was studied by a direct observation technique. The solidliquid interface morphology and crystal texture produced during the freezing of water were studied. For the aqueous solutions two families of knife-edged cells formed, one parallel to the basal plane and one parallel to the c axis. Two preferred crystal textures were observed, corresponding to the two cell families being aligned with the direction of heat flow. For the freezing of pure water, the same two textures were observed; however, the explanation for their occurrence is quite different. Theoretical explanations have been given for all of the texture results and the differences between these results and those found by other investigators. (Author)

AD-627 130 Fld. 8/12, 8/8
CFSTI Prices: HC $2.00 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
ACCURACY OF FIELD SNOW SURVEYS, WESTERN UNITED STATES, INCLUDING ALASKA.
Technical rept.,

by R. A. Work, Homer J. Stockwell, T. G. Freeman, and R. T. Beaumont. Aug 65, 50p. Rept. no. TR-163
Task DA-1V014501B52A31

Unclassified report

Prepared in cooperation with Soil Conservation Service, Portland, Oreg.

Descriptors: (*Snow, Measurement), Samplers, Water supplies, Mathematical prediction, Hydrology

The results, observations, and conclusions are presented of one season's study by the Water Forecasting Unit of the Soil Conversation Service which was undertaken to help in the selection of the best system and equipment for measuring the depth and density of Arctic and sub-Arctic snow. Further objectives of the study were to define specific snow survey problems in the Yukon River basin, and to begin the collection of basic data on the water equivalent of snow in that area. Emphasis is placed on the accuracy of water equivalent determinations, field-accuracy tests of snow samplers, and snow survey field tests in Alaska. In general, it was found that the present Federal snow sampler equipment is as ultilitarian as can be found, but modification of the cutter point is needed to reduce over-measurement error. Aerial snow markers provide a reasonably accurate and inexpensive measurement of snow depth. Small oversnow vehicles can be flown to remote areas and used for transportation to snow courses. (Author)

8/13. SOIL MECHANICS

AD-626 654 Fld. 8/13, 13/2
CFSTI PricesMF $0.50
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS
THERMAL STABILIZATION OF SOILS, EXPLORATORY LABORATORY STUDIES.
Rept. no. 1, Oct 63-Apr 64,
by Delbert E. Day. Nov 65, 53p. Rept. no. TR-6-706
Proj. 1-A-013001-A-03909

Unclassified report

Availability: U. S. Army Engineer Waterways Exp. Sta., Vicksburg, Miss. HC $0.75, CFSTI MF $0.50.

Descriptors: (*Soil mechanics, Stabilization systems), Soils, Binders, Additives, Ceramic materials, Heating, Feasibility studies, Civil engineering

An exploratory laboratory investigation was conducted in which attempts were made to stabilize five soils of widely varying composition by thermal methods. Three additives (cryolite, borax, and glass) were tested as fluxing agents. Unconfined compressive strengths of fired samples were determined on both dry and soaked specimens. Reactions occurring in the soils without additives and in the soil-additive combinations were determined by X-ray diffraction analysis. Test results indicate that the type of additive needed to achieve stabilization at a significantly lower temperature than would otherwise be necessary is dependent on the composition of the soil. Soils with high clay contents tend to be stabilized at lower temperatures than those containing appreciable amounts of quartz. Additives which react with the silicate minerals in the soil appear to lower the stabilization temperature to a greater extent than those which simply melt when heated and resolidify when cooled. It was concluded that soil stabilization by thermal methods can be achieved on almost any soil provided it is heated to a high enough temperature (approximately 1800 F) to cause glass formation; however, economical methods of handling, heating, and placing the material need to be developed. (Author)

AD-626 899 Fld. 8/13, 18/3, 19/4
CFSTI Prices: HC $3.00 MF $0.75
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS
ENGINEERING PROPERTIES OF NUCLEAR CRATERS. REPORT I. SITE SELECTION INVESTIGATIONS, WET MEDIUM CRATERING EXPERIMENTS.
Technical rept.,
by R. T. Saucier, and D. C. Banks. Oct 65, 84p. Rept. no. TR-3-699

Unclassified report

Descriptors: (*Cratering, Site selection), (*Soil mechanics, Cratering), Nuclear explosions, Detonations, Soils, Geological survey, Utah

Investigations were conducted to select a site suitable for producing craters in a saturated cohesive medium by small-scale high-energy detonations. According to prescribed criteria, the ideal site would be a large (200 acres or more), cleared, moderately flat tract of Federally owned land characterized by soft, homogeneous clays to a minimum depth of 40 feet. An evaluation of the U. S. by physical divisions revealed that suitable sites might occur in four general areas, i.e. (1) the Lake Bonneville area, (2) the Lake Agassiz area, (3) the Great Lakes area, and (4) the Lower Mississippi Valley area. Acquisition and analyses of pertinent data on these areas indicated a need for field reconnaissances except in the case of the Great Lakes area which was eliminated from further consideration because of heterogeneous soil deposits. A reconnaissance of the Lake Bonneville area indicated the presence of apparently favorable test site conditions in a portion of the Dugway Proving Ground, Utah. The Dugway site was concluded to be the most suitable for the project. (Author)

AD-626 943 Fld. 8/13, 13/2
CFSTI Prices: HC $2.00 MF $0.50
OHIO RIVER DIV LABS CINCINNATI
RESULTS OF TESTS TO DETERMINE THE FEASIBILITY OF STABILIZING SOILS CONTAINING GYPSUM WITH LIME AND CEMENT.
Jan 64, 36p. Rept. no. TR-4-33

Unclassified report

Descriptors: (*Soil mechanics, Stabilization systems), Binders, Soils, Additives, Limestone, Gypsum, Cements, Compressive properties, Civil engineering, Feasibility studies

The purpose of the tests reported herein was to evaluate the effectiveness of lime and cement to stabilize a soil containing an appreciable percentage of calcium sulphate, commonly referred to as gypsum. Soil used for the tests was obtained from Perrin Air Force Base, Texas; this soil contains gypsum in its natural state. Conventional laboratory soil tests were used for the determination of the physical properties of the natural soil and to determine what, if any, strength gain or property change resulted when varying percentages of hydrated lime or cement were added to the soil and the mixture allowed to cure for different periods of time. This report contains the results of the laboratory tests conducted, pertinent conclusions, and recommendations as to the test procedures for determining the applicability of using lime or cement to stabilize unusual or so-called 'contaminated' soils. (Author)

AD-626 993 Fld. 8/13, 13/6
CFSTI Prices: HC $3.00 MF $0.75
WILSON NUTTALL RAIMOND ENGINEERS INC CHESTERTOWN MD
A DIMENSIONLESS CONSOLIDATION OF WES DATA ON THE PERFORMANCE OF SAND UNDER TIRE LOADS.
Final rept.,
by C. J. Nuttall,Jr.. Dec 65, 82p. Contract DA-22-079-eng-262 Proj. DA-1-V-0-21701-A-046 Task 03
AEWES CR-3-130

Unclassified report

Descriptors: (*Soil mechanics, Trafficability), (*Tires, Trafficability), Sand, Vehicles, Mobility

A semiempiric, dimensionless load coefficient is developed from extensive field and laboratory data on the performance of pneumatic tires in dry sands. The coefficient appears to collapse these diverse data to a useful degree. The physical meaning of the numeric is discussed, and its relation to some earlier work is shown. A preliminary consolidation of the data using the final form of the numeric is presented. (Author)

AD-627 043 Fld. 8/13, 13/2
CFSTI Prices: HC $4.00 MF $1.00
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
CONSTRUCTION IN MUSKEG. A SUMMARY AND COMPILATION OF CURRENT PRACTICE.
Technical rept.,
by John A. Pihlainen. May 65, 141p. Rept. no. CRREL-TR-134
Contract DA-27-921-eng-8 Task 1V025001A13001

Unclassified report

Descriptors: (*Swamps, Foundations (Structures)), (*Foundations (Structures), Swamps), (*Soil mechanics, Swamps), Roads, Construction, Drainage, Stability, Soils

The basic approaches to construction in muskeg areas are to (1) avoid muskeg, (2) remove the peat, or (3) design for and utilize the muskeg. The complete removal of peat and its replacement by good fill to provide a solid foundation is usually employed for roads crossing shallow deposits or main highways carrying heavy traffic. Current practice in Canada and in the northern U. S. appears to favor mechanical excavation, although deep peat deposits are troublesome. In this case, gravity displacement methods, with or without partial excavation, are often used. Explosives are used less now than prior to World War II, due to the unpredictable results. The use of hydraulic stabilization or jetting is almost confined to the State of Minnesota, although the method has considerable potential where large amounts of granular fill and water are available. Stability, settlement, and frost action must be considered when building on peat. With flotation methods the bearing capacity is utilized and continued settlements are accepted. The sand-drain technique has been applied to stabilize 'soft' deposits but it is now questionable. Pile foundations are the least affected by peat properties. Drainage of a muskeg area is usually extremely difficult and often impossible. Extracts of selected references on muskeg and peat have been grouped in appendixes dealing with general aspects, mechanical excavation, displacement, jetting, explosives, flotation, consolidation, accelerated settlements, and subsidiary methods in current practice. (Author)

AD-627 079 Fld. 8/13, 14/2
CFSTI Prices: HC $4.00 MF $1.00
UNITED RESEARCH SERVICES CORP BURLINGAME CALIF
STUDY OF THE DYNAMIC STRESS-STRAIN AND WAVE-PROPAGATION CHARACTERISTICS OF SOILS: REPORT 1. CONCEPTS, EQUIPMENT, AND TECHNIQUES FOR THE STUDY OF THE DYNAMIC BEHAVIOR OF SOILS,
by J. V. Zaccor, H. G. Mason, and D. F. Walter.
Nov 64, 139p. Contract DA-22-079-eng-373
AEWES CR-3-91

Unclassified report

Descriptors: (*Soil mechanics, Laboratory equipment), Soils, Dynamics, Stresses, Strain (Mechanics), Shock waves, Propagation, Test methods, Test equipment

The general approach, physical concepts, and methods employed in the actual development of the equipment are discussed. The equipment and its capabilities are described. A brief summary of concurrent reports that describe results of studies

of response in granular media is presented. The summary indicates that the significant parameters have been correctly identified from theoretical mechanics and suitably measured, since results demonstrate relationships between stress-strain behavior and propagating waves in laboratory devices. The report also summarizes the broad range of protective construction problems which lend themselves to study in this equipment. These include such studies as the effects of reflection phenomena, the effects of layered media, soil-structure interaction in a high-stress field, and the evaluation of disturbances in free-field conditions caused by the presence of a gauge. The latter is shown to be possible by virtue of the ability to measure soil response without placing a gauge in the soil or attaching one to the sample. (Author)

AD-627 032 **See Fld. 13/13**

AD-627 138 **See Fld. 13/13**

8/14. TERRESTRIAL MAGNETISM

AD-627 021 Fld. 8/14, 14/2
CFSTI Prices: HC $2.00 MF $0.50
ELECTRICAL ENGINEERING· RESEARCH LAB UNIV OF TEXAS AUSTIN
INSTRUMENTATION FOR GEOFIELD MEASUREMENTS.
Technical rept.,
by George Hopkins,Jr.. 31 Dec 65, 46p. Rept. no. EERL-138
Contract Nonr-375 (14) Proj. NR-371-032
Unclassified report

Descriptors: (*Terrestrial magnetism, Instrumentation), Electric fields, Magnetic fields, Measuring devices (Electrical + electronic), Telluric currents

The instrumentation and measurement techniques used by the Geomagnetic Division of the Electrical Engineering Research Laboratory of The University of Texas in making micropulsation measurements are described. Expressions for the transfer functions are given to allow a complete analytical representation of the system. Field technique is discussed. (Author)

AD-627 127 **See Fld. 8/7**

Field 9-ELECTRONICS AND ELECTRICAL ENGINEERING

9/1. COMPONENTS

AD-626 661 Fld. 9/1, 13/8
CFSTI Prices: HC $3.00 MF $0.50
TEXAS INSTRUMENTS INC DALLAS
PRODUCTION ENGINEERING MEASURES (PEM) FOR A GERMANIUM MICROWAVE TRANSISTOR.
Quarterly progress rept. no. 5, 30 Jun-30 Sep 65. 30 Sep 65, 57p. Rept. no. TI-03-65-118
Contract DA-36-039-AMC-03632 (E) Task h
Unclassified report

See also AD-622 982.

Descriptors: (*Transistors, Manufacturing methods), (*Microwave equipment, Transistors), (*Germanium, Transistors), Noise (Radio), Ultrahigh frequency, Performance (Engineering), Doping, Life expectancy, Tests, Electrical properties

The preproduction phase of the manufacture of a (1.5 GHz to 3.0 GHz) germanium PEM device is progressing satisfactorily. All equipment necessary to manufacture the device has been installed, and is presently being used specifically for the purpose of training PEM personnel. The PEM process flow is described and accumulative yield curves are shown. Life test data on L-78 and L-78A devices after 4000 hours and 5000 hours are shown. Substantial progress was made toward eliminating the failure mode of PEM devices, type L-148 subjected to the soldering heat test. The primary failure mode is electrical opens. The number of devices exhibiting this type of failure mode was reduced by using larger bonding wire. The bonding process is being investigated in order to obtain a bond with sufficient cross-sectional area so as to assure a lasting bond. A complete program was initiated in order to develop techniques for accurately determining the equivalent circuit of the L-148 chip. An approximate equivalent circuit of the L-148 chip is shown in this report. Diffusion and alloy furnaces temperature profiles were obtained and found to be satisfactory.

AD-626 696 Fld. 9/1, 20/14
STATE UNIV OF NEW YORK STONY BROOK COLL OF ENGINEERING
A PHASE-INTEGRAL APPROXIMATION FOR THE CURRENT DISTRIBUTION ALONG A LOG-PERIODIC ANTENNA,
by Richard B. Kieburtz. 2 Apr 65, 10p. Rept. no. TR-37 ,Scientific-1
Contract AF19 (628)-4144 Proj. AF-4600 Task 460004
AFCRL 65-799
Unclassified report

Availability: Published in IEEE Transactions on Antennas and Propagation vAP-13 n5 p813-4 Sep 1965. Copies to DDC users only.

Descriptors: (*Log periodic antennas, Electric currents), (*Antenna feeds, Log periodic antennas), Approximation (Mathematics), Phase measurement, Integrals, Antenna radiation patterns

The variation of current with distance from the apex along the feed line of a log-periodic antenna is considered. The current distribution is found to be given approximately by a phase-integral formula in which the differential phase increment is related to the propagation constant on the prototype periodic structure. Conditions for the validity of the phase-integral approximation are investigated. These conditions are that the spacing between adjacent radiating elements is much less than the wavelength, and that the logarithmic increment in the phase constant from one cell of the structure to the next is much smaller than unity. (Author)

AD-626 806 Fld. 9/1
CFSTI Prices: HC $2.00 MF $0.50
MICHIGAN UNIV ANN ARBOR
INVESTIGATION OF LARGE-SIGNAL KLYSTRON AND TRAVELING-WAVE DEVICES.
Quarterly progress rept. no. 4, 1 Jun-1 Sep 65,
by G. T. Konrad, and J. E. Rowe. Dec 65, 48p.
Contract AF30 (602)-3569 Proj. AF-5573, 06847 Task 557303
RADC 65-430
Unclassified report

See also AD-626 424.

Descriptors: (*Klystrons, Performance (Engineering)), (*Traveling-wave tubes, Performance (Engineering)), Electron guns, Boundary valve problems, Electron beams, Stability, Noise (Radio), Microwave amplifiers, Backward wave oscillators, Magnetrons

The behavior of Brillouin beams in TWA's is evaluated. The effects of magnetic field strength, as well as other parameters, on the beam geometry and the r-f voltage buildup along the beam are presented. The radial distribution of electrons at the saturation plane is also determined for typical operating parameters. The continuation of work on the nonlinear, boundary-value problems in electron and plasma devices is described. A method of integrating the equations is presented and the error propagation in the solution is discussed. Experimental results obtained in the beam analyzer on a solid-beam gun are described. This gun is to be used eventually in the beam stability experiments in the presence of large-signal r-f. The magnetron injection gun computer program work is described. The cathode current density can now be reliably handled in the program, but cycloiding problems at the cathode are still shown to be present. The initial results from testing the UHF tube containing a magnetron injection gun are discussed. Future plans for this work are outlined. Operation under cw conditions is shown to be necessary in order to obtain noise measurements on the tube. (Author)

AD-626 846 Fld. 9/1
CFSTI Prices: HC $3.00 MF $0.75
MICHIGAN UNIV ANN ARBOR ELECTRON PHYSICS LAB
VELOCITY TAPERING IN RING-AND-BAR STRUCTURES.
Technical rept.,
by J. L. Mason. Dec 65, 86p. Rept. no. TR-87
Contract AF30 (602)-3569 Proj. AF5573 ,06847 Task 557303
RADC TR-65-456
Unclassified report

See also AD-618 916.

Descriptors: (*Traveling-wave tubes, Tests), (*Klystrons, Tests), Dielectrics, S band, Rods, Taper, Design

Cold-test measurements were made on four ringand-bar slow-wave structures. The effects of dielectric support rods and a shield on the phase velocity and impedance of the structures are shown in a series of graphs. Couplers for use with the structures were designed and are discussed; the elliptic cavity coupler was found to be the best type for the ring-and-bar structure. An S-band mediumpower traveling-wave tube was built and tested. The design of a velocity-tapered ring-and-bar structure is presented. (Author)

AD-626 849 Fld. 9/1, 13/8
CFSTI Prices: HC $3.00 MF $0.75
TRW SEMICONDUCTORS INC LAWNDALE CALIF RESEARCH AND DEVELOPMENT DEPT
TRANSISTOR, VHF, SILICON, POWER TYPE EL-2N (X-9) 5W 500MC PEM.
Quarterly rept. no. 1, 1 May-31 Jul 65,
by R. Clarke, J. Crishal, J. Rice, and W. Weisenberger. 31 Jul 65, 55p. Contract DA-36-AMC-06163 (E)
Unclassified report

Descriptors: (*Transistors, Manufacturing methods), (*Very high frequency, Transistors), Power amplifiers, Silicon, Packaging, Mechanical drawings, Ceramic materials, Beryllium compounds, Oxides, Doping, Boron, Phosphorus, Diffusion, Performance (Engineering)

The program plan was completed during the first quarter. Design improvements, principally in the package design, have been made during this quarter to improve the performance of the 10 watt, 500Mc Research and Development device to meet the 10 dB power gain, 50% collector efficiency goals. Optimized pattern designs were also investigated. Dissusion of the first wafers has taken place with good results. Work on contact metallizing was directed at reducing wafer breakage, emitter-base shorting, and at improving thickness control. Work was started on sputtering of alternate contact metals. Work was started on glassification of both wafers and unmolded transistor assemblies.

AD-626 859 Fld. 9/1
CFSTI Prices: HC $2.00 MF $0.50
MCCOY ELECTRONICS ,CO MOUNT HOLLY SPRINGS PA
PRODUCTION ENGINEERING MEASURE. MANUFACTURE OF GLASS HOLDER CRYSTAL UNITS TYPE CR (XM-66)/U.

Quarterly progress rept. no. 1, 25 Jun-25 Sep 65. 25 Sep 65, 26p. Contract DA-36-039-AMC-06167 (E)

Unclassified report

Descriptors: (*Quartz resonators, Manufacturing methods), (*Crystal holders, Manufacturing methods), (*Glass, Crystal holders), Vibrators (Electrical), Specifications, Processing

During the report period, the scheduling dates, production measures and the preliminary crystal design were agreed upon and action taken to execute them. The Flow Chart with the scheduling dates spelled out by the contract was submitted to the Contracting Officer and approval received. A crystal support design was agreed upon which would not contain any resonant points below 500 cps and still give satisfactory yield in meeting the Q requirement. The initial ordering and processing of the resonator was initiated and they are presently in the final stage of fabrication. (Author)

AD-626 985 Fld. 9/1, 7/2, 20/12
CFSTI Prices: HC $5.00 MF $1.00
RESEARCH TRIANGLE INST DURHAM N C
INTEGRATED SILICON DEVICE TECHNOLOGY. VOLUME X. CHEMICAL/METALLURGICAL PROPERTIES OF SILICON.
Rept. for Oct 64-Oct 65,
by B. N. Padnos. Nov 65, 190p. Contract AF33 (615)-1998 Proj. AF-4159 Task 415906
ASD TDR-63-316-Vol-10

Unclassified report

See also AD-624 520.

Descriptors: (*Silicon, Phase studies), (*Silicides, Physical properties), (*Semiconductor devices, Silicon), Etching, Molecular weight, Crystal structure, Density, Solubility, Electrical properties, Magnetic properties, Thermal properties, Chemical reaction, Preparation

A complete set of existing silicon binary phase diagrams and a complete listing of known binary silicides, along with some of their properties, are presented in convenient reference form. Reactions of silicon with common reagents are summarized, emphasizing those reactions dominant in the chemical etching and polishing of silicon. A technique for spin-etching silicon wafers is also described. (Author)

AD-627 034 Fld. 9/1, 14/4
CFSTI Prices: HC $1.00 MF $0.50
VARIAN ASSOCIATES BEVERLY MASS QUANTUM ELECTRONICS DIV
CESIUM BEAM TUBE RESEARCH.
Quarterly progress rept. no. 3, 1 Jul-30 Sep 65,
by Joseph H. Holloway. 30 Sep 65, 18p. Contract DA-28-043-AMC-00464 (E) Proj. DA-1P6-22001-A-058 Task 1P6-22001-A-058-03

Unclassified report

See also AD-624 613.

Descriptors: (*Cesium electron tubes, Reliability (Electronics)), Electron beams, Deflection, Magnets, Transistors, Collimators, Magnetic fields, Optical properties, Stability, Life expectancy, Microwave equipment, Wave transmission, Electron tube parts

Progress was made on the completion of parts for the demountable beam tube test chamber, and experimental work was carried out on the deflection magnets and detector ion optics for this chamber. Parts for a microwave test cavity were nearly completed. (Author)

AD-627 063 Fld. 9/1
CFSTI Prices: HC $1.00 MF $0.50
RADIO CORP OF AMERICA SOMERVILLE N J ELECTRONIC COMPONENTS AND DEVICES
DEVELOPMENT AND EVALUATION OF TRANSISTOR, FIELD EFFECT, INSULATED GATE, 400-MEGACYCLE AMPLIFIER.
Quarterly progress rept. no. 1, 15 Jun-14 Sep 65,
by R. W. Ahrons, N. H. Ditrick, and M. M. Mitchell. Oct 65, 24p. Contract DA-28-043-AMC-01453 (E) Proj. DA-5900-21-243-08 Task 5900-21-243-08-00
ECOM 01453-1

Unclassified report

Descriptors: (*Transistor amplifiers, Ultrahigh frequency), Oxides, Metals, Semiconductors, Triodes, Tetrodes, Pentodes, Cascade structures, Integrated circuits, Gate circuits, Radiofrequency amplifiers, Gain, Noise (Radio), Performance (Engineering)

During the report period, an assessment was made of the capability of currently available metal oxide semiconductor (MOS) tetrodes to fill the requirement of a 400megacycle amplifier. In addition, photomasks for the determination of optimum channel length and width for tetrode and pentrode units were designed and fabricated and a capability was developed for measuring the power gain and noise figure of triode, tetrode, and pentode structures at 400 megacycles. Currently available tetrodes yield typical power gain values at 400 megacycles of 10 to 13 dB. This yield is below the contract objective of 20 dB gain at that frequency. (Author)

AD-627 074 Fld. 9/1, 12/1
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
CALCULATION OF THE FIELD OF AN ASYMMETRICAL STRIP TRANSMISSION LINE TAKING INTO ACCOUNT THE THICKNESS OF THE STRIP.
by I. S. Kovalev. 4 Jan 66, 11p. Rept. no. FTD-TT-65-1470
TT 66-60364

Unclassified report

Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Energetika (USSR) v8 n1 p105-9 1965.

Descriptors: (*Strip transmission lines, Field theory), (*Field theory, Determination), Distribution theory, Taylor's series, USSR

AD-627 137 Fld. 9/1, 13/8
CFSTI Prices: HC $2.00 MF $0.50
GENERAL INSTRUMENT CORP DARLINGTON S C CAPACITOR DIV
PRODUCTION ENGINEERING MEASURE FOR THE IMPROVED RELIABILITY OF CAPACITORS, FIXED, SOLID ELECTROLYTE, TANTALUM HIGH-RELIABILITY 100 MFD-20 VOLT CAPACITORS.
Quarterly rept. no. 8, 29 Mar-28 Jun 65,
by Floyd R. Banks, Jr., and A. Di Giacomo. 28 Jun 65, 40p. Contract DA-36-039-AMC-03622 (E)

Unclassified report

See also AD-619 081.

Descriptors: (*Tantalum capacitors, Manufacturing methods), Fixed capacitors, Binders, Processing, Anodic coatings, Coatings, Carbon, Silver, Aging (Materials), Tests, Temperature stability, Quality control, Life expectancy, Reliability (Electronics), Performance (Engineering)

Process improvement studies were conducted primarily on the 100 MFD - 20 Volt capacitor; some of these studies were applied to the 6.8 - 35 volt rating. The areas of process improvement studies were: (1) tantalum powder control; (2) binder and binder ratio; (3) anodizing and reforming; (4) carbon and silver coating; and (5) ageing. Evaluations of combinations of these process improvement studies were made through a series of matrix tests which included temperature cycling, 40-hour burn-in, temperature stability, surge voltage tests, surge voltage tests followed by short term life-tests (40 hours), and life-tests. A reliability prediction is given in which the basis for confidence in attaining the objective of a failure rate of 0.001 percent per thousand hours at a 60 percent confidence level is given. (Author)

AD-627 154 Fld. 9/1
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
TRANSMISSION MODE UHF MAGNETO-ACOUSTIC DELAY LINE.
Technical rept.,
by W. Skudera, R. Sproat, I. Bady, and E. Gikow. Dec 65, 39p. Rept. no. ECOM-2641
Proj. DA-1C0-24401-A-348 Task 1C024401A34800

Unclassified report

Descriptors: (*Delay lines, Transmission lines), (*Transmission lines, Delay lines), Very high frequency, Ultrahigh frequency, Garnet, Magnetic fields, Standing wave ratios, Acoustic properties, Impedance matching, Single crystals, Reduction, Ferromagnetic materials, Iron compounds, Yttrium compounds

Results are presented on the investigation of an experimental magneto-acoustic transmission delay line using a single crystal rod of yttrium iron garnet (YIG), over the frequency range of 200 to 1000 megacycles. Data are given on delay time and insertion loss as a funtion of magnetic bias field. Both a slow and a fast variation of insertion loss with bias field are noted. The slow variation of insertion loss is quite flat and insertion loss is at a minimum, over the range of 900 to 1050 oersteds, for all frequencies from 200 to 1000 mc. Measurements of VSWR of an untuned line show that the losses due to impedance mismatch account for a relatively small portion of the overall insertion loss. A study of the fast variation of insertion loss shows that this variation occurs only over a portion of the pulse. Therefore, if the pulse is short enough the fast variation is absent. Also small permanent magnets are used to supply a biasing field orthogonal to the primary biasing field that is parallel to the rod axis. The effects of the orthogonal field on the slow and fast variations of insertion loss are described. In addition, two YIG rods were bonded together to provide longer delays than possible with available single rods. Data is presented on the variation of delay time and insertion loss with field of the bonded line. (Author)

AD-627 178 Fld. 9/1, 20/12
CFSTI Prices: HC $2.00 MF $0.50
RADIO CORP OF AMERICA SOMERVILLE N J ELECTRONIC COMPONENTS AND DEVICES
DEVELOPMENT OF INTEGRATED CIRCUITS UTILIZING COMPLEMENTARY TRANSISTORS.
Interim development rept. no. 2, 1 Oct-31 Dec 65.
31 Dec 65, 50p. Contract NObsr-93365 Proj. SR-008-0303 Task 9631

Unclassified report

See also AD-623 510.

Descriptors: (*Integrated circuits, Transistors), (*Transistors, Integrated circuits), Substrates, Processing, Doping, Oxides, Etched crystals, Epitaxial growth, Silanes, Semiconducting films, Manufacturing methods, Design

Installation of systems for the deposition of both doped and undoped layers of silicon dioxide was completed. Work on the preparation of substrates containing isolated n and p regions is slightly behind schedule, but some major obstacles were overcome. Preliminary design of the circuit was completed and a discussion of it is included in this report. (Author)

AD-627 259 Fld. 9/1, 1/4, 13/10
CFSTI Prices: HC $3.00 MF $0.50
NAVAL AMMUNITION DEPOT CRANE IND
MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
1 Dec 65, 55p. Rept. no. NAD-65-905
Unclassified report

Descriptors: (*Naval equipment, Microminiaturization (Electronics), (*Microminiaturization (Electronic), Naval equipment), Power supplies, Integrated circuits, Epitaxial growth, Mixers (Electronics), Crystral oscillators, Relaxation oscillators, Test equipment (Electronics), Semiconducting films

Contents: Microelectronic Power supply program, resume of integrated circuit thermal study, epitaxial studies (Part VI), evaluation of westinghouse oscillatormixer, evaluation of fairchild monostable multivibrator, evaluation of fairchild dual comparator, compilation of semiconductor integrated circuits evaluated to date.

AD-626 829 **See Fld. 20/12**

AD-626 878 **See Fld. 9/5**

AD-626 992 **See Fld. 13/8**

AD-627 004 **See Fld. 20/3**

AD-627 046 **See Fld. 20/5**

AD-627 084 **See Fld. 20/5**

9/2. COMPUTERS

AD-626 731 Fld. 9/2, 5/6
CFSTI Prices: HC $2.00 MF $0.50
HAWAII UNIV HONOLULU DEPT OF ELECTRICAL ENGINEERING
AN EFFICIENT RECOGNITION AND SYNTAX-ANALYSIS ALGORITHM FOR CONTEXT-FREE LANGUAGES.
Scientific rept.,
by Tadao Kasami. 11 Jul 65, 40p. Rept. no. Scientific-2
Contract AF19 (628)-4379 Proj. AF-5628 Task 562801
AFCRL 65-558
Unclassified report

Descriptors: (*Programming languages, Algorithms), (*Context free grammars, Algorithms), Syntax, Analysis, Magnetic tape, Computer logic, Computer storage devices

An efficient algorithm of recognition and syntaxanalysis for the full class of context-free languages without the difficulty of exponential growth of computing time with the length n of input sequence is presented. This algorithm makes use of the essential property of a context-free language as a multi-parenthesis system. It is shown in this paper that a context-free language is n cubed-recognizable in the sense of Hartmanis and Stearns ('Computational complexity of recursive sequences'. Proc. Fifth Annual Symposium of Switching Circuit Theory and Logical Design (Oct. 1964) p.82-90) by a double-tape or double-head single-tape Turing machine and it is n to the 4th power-recognizable by a single-head single-tape Turing machine. If we use a random-access memory whose size is proportional to n cubed, the computing time required for syntaxanalysis is upper-bounded by C (1)n cubed + C (2)n squared N, where N denotes the number of nonequivalent valid derivation sequences for a given input sequence and C (i)'s are constants independent of input sequences. If we use a tape of length C (3)n cubed and one of length C (4)n squared as working memories, the computing time for syntax-analysis is upperbounded by C (5)n cubed (1 + N). The size of required memory can be reduced to the order of n squared, but the computing time rises to the order of n to the 4th power. (Author)

AD-626 733 Fld. 9/2, 9/5
CFSTI Prices: HC $1.00 MF $0.50
HAWAII UNIV HONOLULU DEPT OF ELECTRICAL ENGINEERING
SOME RESULTS ON CAPABILITIES OF ONEDIMENSIONAL ITERATIVE LOGICAL NETWORKS AND THEIR RELATED PROBLEMS.
Scientific rept.,
by Tadao Kasami. 1 Aug 65, 24p. Rept. no. Scientific-4
Contract AF19 (628)-4379 Proj. AF-5628 Task 562801
AFCRL 65-602
Unclassified report

Descriptors: (*Computer logic, Iterative methods), Electrical networks, Theory, Automata, Programming languages, Context free grammars, Magnetic tape, Sequence switches

Results on capabilities of one-dimensional systems of iterative logical networks are presented. It is shown that (1) Kilmer's result (AD-425 943) implies a positive answer to Hennie's conjecture ('Iterative arrays of logical circuits,' MIT Press, Cambridge, Mass. 1961) that the unilateral systems which are stable in the wide sense are more powerful than the strictly stable unilateral systems, (2) the unilateral systems which are stable in the wide sense are more powerful then the nondeterministic push-down automata, (3) the strictly stable unilateral systems are more powerful than the deterministic push-down automata and (4) a proper subclass of strictly stable unilateral systems is more powerful in a sense than the class of two-tape one-way automata. It also is proved that (1) a language generated by a linear grammar is n squared-recognizable by a single-tape Turing machine in the sense of Hartmanis and Stearns ('Computational complexity of recursive sequences.' Proc. Fifth Annual Symposium of Switching Circuit Theory and Logical Design', (Oct. 1964) p. 82-90) and (2) there is a language which is generated by a linear grammar and is not n-recognizable. (Author)

AD-626 776 Fld. 9/2, 20/8
CFSTI Prices: HC $2.00 MF $0.50
CALIFORNIA UNIV LOS ANGELES DEPT OF PHYSICS
A FORTRAN PROGRAM FOR THE REDUCTION OF DIFFERENTIAL CROSS SECTION DATA.
Technical rept.,
by Henry Willmes. Nov 65, 26p. Rept. no. P-72
Contract Nonr-233 (44)
Unclassified report

Descriptors: (*Programming (Computers), Differential cross sections), (*Differential cross sections), (*Differential cross sections, Proton scattering), Elastic scattering, Proton cross sections, Center of mass, Programming languages

A computer program in FORTRAN IV language is given for the reduction of differential cross section data for proton-induced reactions of the type A (p,x)B. Given the raw data, the program determines the cross section in the laboratory and center-of-mass coordinate systems, with options of applying a number of corrections. For elastic proton scattering, the ratic of the center-of-mass to the Rutherford cross section can also be obtained. (Author)

AD-626 795 Fld. 9/2, 8/4
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
CONTROLS OF EQUALIZING TRIANGULATION COMPUTATIONS BY COMPUTER,
by G. M. Grinberg. Dec 65, 9p. Rept. no. FSTC-381-T65-677
TT 66-60289
Unclassified report

Trans. of Geodeziya i Kartografiya (USSR) n7 p25-8 1964.

Descriptors: (*Geodesics, Programming (Computers)), (*Programming (Computers), Surveying), Control, Errors, USSR

AD-626 807 Fld. 9/2, 17/2
CFSTI Prices: HC $3.00 MF $0.75
MELPAR INC FALLS CHURCH VA
INVESTIGATION OF SPEECH PROCESSING STUDIES.
Scientific rept. no. 1, 1 Feb 64-30 Sep 65,
by H. A. Straight, O. C. King, and K. H. Shingler. Oct 65, 68p. Contract AF19 (628)-4032 Proj. 4610 ,0000 Task 461002 ,000035
AFCRL 65-847
Unclassified report

Descriptors: (*Data processing systems, Voice communication systems), (*Speech representation, Data processing systems), Pattern recognition, Digital systems, Speech compression, Speech, Sound pitch, Statistical analysis, Magnetic tapes, Computers, Input-output devices, Magnetic tape, Punched tape, Frequency

The report contains the results of an investigation using a digital Voice Data Processor (AD-286 097, AD-286 158). The system is a special-purpose data processor designed to support research on digital voice communications and, in particular, the evaluation of a speech bandwidth compression technique. Although the continuing investigation has provided support to the research effort, it has more pertinently styled the growth of the data processor as a research tool. The most significant modification to the system has been the incorporation of two digital magnetic tape units as additional input/output equipments. Other changes which have been made include the capability of compiling rank-ordered data in tables of specified values for pattern frequency; the tabulating the frequency distribution of pattern deviation values; and, the tabulation of the number of missed pattern matches in a specific number of voice samples. These changes have significantly expanded the capability and flexibility of the processor and also greatly decreased the general processing time required. With the increase in capability has gone a comparable increase in programming requirements by the operator; the revised System Operating Instructions are included as Appendix A. (Author)

AD-626 819 Fld. 9/2, 5/7, 5/2, 9/4, +
CFSTI Prices: HC $5.00 MF $1.00
APPLIED DATA RESEARCH INC PRINCETON N J
INFORMATION SYSTEM THEORY PROJECT. VOLUME I. MEM - THEORY. A MATHEMATICAL METHOD FOR THE DESCRIPTION AND ANALYSIS OF DISCRETE, FINITE INFORMATION SYSTEMS.
Final rept.,
by Anatol W. Holt, Spencer O. Chagnon, Robert M.Shapiro, and Stephen Warshall. Nov 65, 194p. Contract AF30 (602)-3324 Proj. AF-4594 Task 459403
RADC TR-65-377-Vol-1
Unclassified report

Prepared in cooperation with Computer Associates, Inc., Wakefield, Mass. See also AD-626 820.

Descriptors: (*Computers, Theory), (*Data processing systems, Theory), Information theory, Simulation, Data, Programming languages, Semantics, Information retrieval, Computational linguistics, Grammars, Artificial intelligence, Automata, Graphics

A discrete information system may be abstractly conceived as a domain of 'entities' characterized as to the following: an ensemble of possible states

of mutual relation; a collection of possible 'local' transformations of system state; and 'coupling' possibilities which determine how the system may interact with 'environments.' As between several such systems, relations such as 'behavioral equivalence' and 'representation' may be defined. In respect to computer systems, the most diverse information processing and/or exhibiting 'devices,' whether hard or soft or a combination of both, are to be amenable to mem-theoretic treatment. From the point of view of automata theory, mem-theory provides a method for constructing deterministic or non-deterministic finite state automata to explicate some informally-given' interesting varieties of complex, discrete behavior. From such treatment, one is to obtain the capacity to describe, contrast and evaluate alternate organizational techniques and to be led to the invention of new ones. (Author)

AD-626 820 Fld. 9/2, 5/7, 5/2, 9/4, +
CFSTI Prices: HC $6.00 MF $1.50
APPLIED DATA RESEARCH INC PRINCETON N J
INFORMATION SYSTEM THEORY PROJECT. VOLUME II. COLLECTED RESEARCH PAPERS.
Final rept.,
by Thomas E. Cheatham, Carlos Christensen, Robert W. Floyd, G. F. Leonard, and J. R. Goodroe.
Nov 65, 278p. Contract AF30 (602)-3324
Proj. AF-4594 Task 459403
RADC TR-65-377-Vol-2
Unclassified report

Prepared under subcontract by Computer Associates, Inc., Wakefield, Mass., Rept. nos. CA-6505-0611, CA-6505-2611, CA-6504-0111, and CA-64-4-R. See also AD-626 819.

Descriptors: (*Computers, Theory), (*Data processing systems, Theory), Compilers, Programming languages, Flow charting, Algorithms, Syntax, Programming (Computers), Computational linguistics

This report contains the working papers developed under contract AF30 (602)-3324 which was addressed to the development of a coherent mathematical foundation for information systems. Papers include Notes on Compiling Techniques and the TGS Translator Generator System by Thomas E. Cheatham, AMBIT: A programming Language for Algebraic Symbol Manipulation and Examples of Symbol Manipulation in the AMBIT Programming Language by Carlos Christianson, The Syntax of Programming Languages, A Survey, Flowchart Levels, NonDeterministic Algorithm and several algorithms and proofs of algorithms by Robert Floyd and An Environment for an Operating System by G. F. Leonard and J. R. Goodroe. (Author)

AD-626 882 Fld. 9/2
LINCOLN LAB MASS INST OF TECH LEXINGTON
GRAPHICAL COMMUNICATION AND CONTROL LANGUAGES,
by L. G. Roberts. 1964, 7p.
Unclassified report

Supported by U. S. Air Force.

Availability: Published in Information System Sciences p211-7 nd. Copies to DDC users only.

Descriptors: (*Graphics, Data processing systems), (*Programming languages, Graphics), Computers, Computer storage devices, Computer logic, Problem solving, Control systems, Display systems

The future far computer processing of graphics is alleged to be manipulation of data files and programs external to the graphical package. Pictures are regarded as abstractions that are used as labels for external entities so that it is possible to create interconnect, and rearrange the entities with a 2-dimensional language rather than the normal 1-dimensional text stream. The CORAL (class-Oriented Ring Association Language) list structure system for graphical and other problems is described. The list structure concepts are similar to these used to implement SKETCH PAD on the TX-2 computer, but storage space is reduced and a more complete list structure system and language is generated. The CORAL list ties are formed as rings, each element in the ring requiring one 36-bit word and containing a 17-bit pointer to the next element. Blocks of elements are used that collect may ties together and allow the multi-dimensional associations required for graphical data structures. This paper also discusses storage, class structures, online problem solving by use of graphical techniques, and display consoles.

AD-626 950 Fld. 9/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
PERMANENT MEMORY DEVICE,
by Yu. P. Letunov, L. G. Sapogin, and E. V. Korlyuga. 25 Oct 65, 6p. Rept. no. FTD-TT-65-507 TT 66-60308
Unclassified report

Unedited rough draft trans. of Russian patent 164 490, appl. no. 816341/26-24, 28 Jan 63, 2p.

Descriptors: (*Computer storage devices, Design), Ferrites, Valves, Patents, USSR

Object of the invention: A permanent memory device containing a ferrite matrix, an address decipherer, an output recorder, and a uniform discrete medium representing a plane network of active trigger elements which has the distinguishing feature that for the purpose of stepping up the rapid action and possibility of processing great volumes of information the outputs of the ferrite matrix are connected to the inputs of uniform plane discrete medium, and the output recorder through valves controlled by the address decipherer, the recorder being connected to the output elements of the discrete medium. (Author)

AD-627 022 Fld. 9/2, 12/1
CFSTI Prices: HC $3.00 MF $0.75
ELECTRICAL ENGINEERING RESEARCH LAB UNIV OF TEXAS AUSTIN
AN ANALYSIS OF DYNAMIC POWER SPECTRA.
Technical rept.,
by W. E. Sims, and F. X. Bostick, Jr.. 31 Dec 65, 82p. Rept. no. EERL-139
Contract Nonr-375 (14) Proj. NR-371 032
Unclassified report

Descriptors: (*Programming (Computers), Statistical functions), (*Statistical functions, Stochastic processes), Dynamics, Power, Data processing systems, Fourier analysis

A digital computer program has been developed for computing and displaying dynamic or running power density spectra, with the results being presented as contour plots having lines of constant spectral density on time-frequency planes. The program is discussed in detail, and samples of the output are included. (Author)

AD-627 163 Fld. 9/2, 17/2
CALIFORNIA UNIV LOS ANGELES DEPT OF ENGINEERING
MICROELEMENTS IN PROCESSOR NETWORKS,
by Gerald Estrin. 1964, 16p. Contract Nonr-233 (52), AT (11-1)-GEN-10 Proj. AT-14
Unclassified report

Availability: Published in Reprint. Copies to DDC users only.

Descriptors: (*Microminiaturization (Electronics), Data processing systems), (*Electrical networks, Microminiaturization (Electronics)), Computer logic, Communication systems, Computers

Large information processor systems and networks are characterized to provide a context for discussion of advances in microelectronics. (Author)

AD-627 164 Fld. 9/2
CFSTI Prices: HC $6.00 MF $1.25
ILLINOIS UNIV URBANA DEPT OF COMPUTER SCIENCE
QUARTERLY TECHNICAL PROGRESS REPORT; JULY, AUGUST, SEPTEMBER 1965.
Sep 65, 209p. Rept. no. C00-1018-1066, C00-1469-0012
Unclassified report

See also AD-625 896.

Descriptors: (*Computers, Scientific research), Circuits, Pattern recognition, Scanning, Photographic film, Numerical methods and procedures, Electrooptics, Programming languages, Pictures, Graphics, Analog-digital computer, Display system

Contents: Circuit research program; hardware systems research; software systems research; Illinois pattern recognition computer: ILLIAC III; numerical methods, computer arithmetic and artificial languages: ILLIAC IV; ILLIAC II service, use, and program development; IBM service, use, and program development; problem specifications; general laboratory information.

AD-626 659 See Fld. 17/2

AD-626 844 See Fld. 20/6

AD-626 878 See Fld. 9/5

AD-626 901 See Fld. 20/3

AD-626 956 See Fld. 5/7

AD-626 969 See Fld. 12/1

AD-626 976 See Fld. 12/1

AD-626 999 See Fld. 20/8

AD-627 083 See Fld. 10/2

AD-627 085 See Fld. 9/5

AD-627 099 See Fld. 12/2

AD-627 142 See Fld. 6/5

AD-627 144 See Fld. 5/1

AD-627 146 See Fld. 9/5

AD-627 152 See Fld. 6/5

AD-627 235 See Fld. 18/11

9/3. ELECTRONIC AND ELECTRICAL ENGINEERNG

AD-626 839 Fld. 9/3
CFSTI Prices: HC $2.00 MF $0.50
CITY COLL RESEARCH FOUNDATION NEW YORK
ELECTROSTATIC FOCUSING OF HOLLOW SPIRALING ELECTRON BEAMS.
Quarterly rept. no. 3, 5 Jul-5 Oct 65,
by Morris Ettenberg. 5 Oct 65, 47p. Contract DA-28-043-AMC-00466 (E) Proj. DA-1P6-22001A-055-04-70
Unclassified report

See also AD-620 601.

Descriptors: (*Electron beams, Focusing), (*Electrostatic fields, Electron beams), Space charges, Design, Programming (Computers), Electromagnetic lenses, Partial differential equations, Trajectories

A third experimental model (SBT-3) for a spiral beam trajectory was designed and constructed. The model showed about 75% beam transmission. A MAD computer program for electron trajectories in cylindrical coordinates (including space charge) is appended.

AD-627 013 Fld. 9/3, 14/2
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
NEW SERIES OF D C MICROMOTORS. SEMICONDUCTOR WATTMETER FOR HIGHFREQUENCY UNITS,
by E. A. Lodochnikov, I. A. Tsyrlin, Yu. P. Shirokov, N. V. Surin, and A. V. Donskoi. Dec 65, 15p. Rept. no. FSTC-381-T65-662
TT 66-60353
Unclassified report

Trans. of Elektrotekhnika (USSR) v35 n7 p40-2, 44-6 1964.

Descriptors: (*Engines + motors, Miniature electrical equipment), (*Wattmeters, Semiconductor devices), Direct current, Design, Switching circuits, USSR

The DPM series of micromotors are direct-current electrical machines with excitation supplied by a permanent magnet. A description is given of switchboard semiconductor wattmeter recommended for use in industrial high-frequency units.

AD-626 693 **See Fld. 9/5**

AD-627 094 **See Fld. 14/2**

9/4. INFORMATION THEORY

AD-626 730 Fld. 9/4
CFSTI Prices: HC $2.00 MF $0.50
HAWAII UNIV HONOLULU DEPT OF ELECTRICAL ENGINEERING
ON THE WEIGHT STRUCTURE AND SYMMETRY OF BCH CODES.
Scientific rept.,
by W. Wesley Peterson. 10 Jul 65, 30p. Rept. no. Scientific-1
Contract AF19 (628)-4379 Proj. AF-5628 Task 562801
AFCRL 65-515
Unclassified report

Descriptors: (*Coding, Errors), Corrections, Information theory, Weight, Distribution

Weight distributions found by digital computation are given for a number of Bose-Chaudhuri-Hocquenghem codes of length (2 to m power)-1 for m as large as ten. The minimum weight was determined in some additional cases which include all non-trivial double, triple, and quadruple error correcting codes by theoretical results and by computer search. In each known case, the true minimum weight meets the Bose-Chaudhuri-Hocquenghem lower bound. It was observed that ja subj = (n + 1 - j)a sub (n + 1 - j) for all BCH codes for which weights were computed, where n is the code length and a sub j the number of code words of weight j. It is shown that a BCH code extended by the addition of an overall parity check is invarient under permutations of the doublytransitive affine group, and the observed equation holds as a consequence of this symmetry. (Author)

AD-626 732 Fld. 9/4
CFSTI Prices: HC $2.00 MF $0.50
HAWAII UNIV HONOLULU DEPT OF ELECTRICAL ENGINEERING
RELIABILITY BOUNDS FOR POLYPHASE CODES FOR THE GAUSSIAN CHANNEL.
Scientific rept.,
by Wesley W. Peterson, and Tadao Kasami. 25 Jul 65, 44p. Rept. no. Scientific-3
Contract AF19 (628)-4379 Proj. AF-5628 Task 562801
AFCRL 65-570
Unclassified report

Descriptors: (*Coding, Reliability), Signal-to-noise ratio, Statistical processes, Errors, Probability, Information theory, Signals, Decoding

Upper and lower bounds on reliability, similar to those given by Shannon (B.S.T.J. 38, 1959, pp. 611-656) are derived and computed for several classes of codes for the gaussian channel which are more restrictive than the classes considered by Shannon. Curves, which include Shannon's results for comparison, are given for selected values of signal-to-noise power ratio ranging from zero to 256. The classes of codes include 1) codes in which all coordinates of each code vector are either = P, where P is the signal power, 2) codes in which successive pairs of coordinates in each code vector are chosen as coordinates of q equally spaced points on a circle, and 3) codes in which successive sets of m coordinates of each code vector are chosen arbitrarily from an m-dimensional sphere. (Author)

AD-626 833 Fld. 9/4
CFSTI Prices: HC $3.00 MF $0.75
INSTITUTE FOR DEFENSE ANALYSES ARLINGTON VA RESEARCH AND ENGINEERING SUPPORT DIV
TRANSMISSION OF COMMAND INFORMATION,
Research paper,
by Leonard Farkas. Oct 65, 100p. Rept. no. RP-P-160 ,IDA/HQ65-4327
Contract SD-50 Task T-32
Unclassified report

Descriptors: (*Information theory, Communication systems), Effectiveness, Entropy, Thermodynamics, Temperature, Correlation techniques, Statistical mechanics, Probability, Errors, Special functions (Mathematical), Uncertainty, Costs

The purpose of this paper is to reconsider the concept of an information measure with respect to a command transmission system. As an introduction, the basis for Shannon's entropy function is considered. Difficulties which arise in the attempt to use either Shannon's singleletter distortion measure or local distortion measure are illustrated. A model of a command transmission system is proposed which differs fundamentally from the usual communication channel model in that the information source does not select symbols or messages on a probabilistic basis. As an approach to the redefinition of the entropy of an information system, a thermodynamic analogy is considered. The implications of measuring the information content of a command transmission by means of the Boltzmann entropy function are explored. It is shown that the functional form of the entropy is independent of an additive constant in the cost function and that a constant or zero cost results in zero entropy as required. Two approaches to the definition of the Lagrange multiplier beta (proportional to temperature in a thermodynamic system and later redefined for a command transmission system) are taken. The application of correlation techniques in the achievement of appropriate transitional probabilities. It is shown that for a command situation in which 'removal of uncertainty' is not an adequate measure of information, Viterbi's independent variable ST/N (o)log (2)M (S.W. Golomb et al. 'Digital Communications with Space Applications'. New Jersey, Prentice-Hall, 1964) is not appropriate.

AD-626 905 Fld. 9/4, 20/14
CFSTI Prices: HC $5.00 MF $1.25
COMMUNICATION SYSTEMS INC PARAMUS N J
ANALYTICAL AND EXPERIMENTAL STUDY OF CORRELATION FUNCTIONS OVER HF CIRCUITS.
Final rept., 1 Jul 64-31 Oct 65,
by F. David, A. P. Baker, R. W. Rudmann, H. Shermanand , and R. Zach. 15 Nov 65, 200p.
Rept. no. CSI-65-TR-773
Contract DA-28-043-AMC-00145 (E) Proj. DA-1E6-34301-D246-01-04
Unclassified report

Descriptors: (*Wave transmission, Ionosphere), (*Statistical functions, Data transmission systems), Continuous wave radar, High frequency, Communication systems, Attenuation

The effects of the ionosphere were determined on multiple CW tones transmitted over a long haul HF circuit by recording the received data modulated by ionospheric perturbations. Reduction and analysis of the data was performed by computers. The results describe the channel behavior during various conditions of the ionosphere in terms of the correlation functions of the received signal, envelope, phase, probability distribution and fading bandwidth. (Author)

AD-626 920 Fld. 9/4, 12/1
CALIFORNIA UNIV BERKELEY DEPT OF ELECTRICAL ENGINEERING
ESTIMATION OF SIGNALS CONTAINING UNKNOWN PARAMETERS: COMPARISON OF LINEAR AND ARBITRARY UNBIASED ESTIMATES.
Revised ed.,
by David J. Sakrison. 11 Jun 64, 15p.
Unclassified report

Revision of manuscript submitted 17 Oct 63.

Availability: Published in Journal of Soc. Indust. Appl. Math., v13 n3 p706-19 Sep 1965. Copies to DDC users only.

Descriptors: (*Signals, Approximation (Mathematics)), (*Approximation (Mathematics), Signals), Functional analysis, Statistical analysis

AD-627 001 Fld. 9/4, 17/2
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS DATA SCIENCES LAB
PLURALITY-COUNT DIVERSITY COMBINING FOR FADING M-ARY TRANSMISSIONS.
Physical and mathematical sciences research papers,
by John N. Pierce. Nov 65, 33p. Rept. no. PMSRP-161
Proj. AF-5628 Task 562805
AFCRL 65-812
Unclassified report

Descriptors: (*Data transmission systems, Diversity reception), (*Diversity reception, Information theory), (*Information theory, Diversity reception), Attenuation, Signals, Coding, Errors, Corrections

The performance of a plurality-count diversity combiner for fading M-ary transmissions is analyzed, and calculated error probabilities are presented graphically for alphabet sizes of 2, 8, and 32. The performance is shown to be within 3 db of that of an optimum square-law combiner for moderate alphabet sizes when there is no restriction on the allowable number of diversity branches. It is shown that a worthwhile saving in transmitter power can be effected by using non-binary alphabets with plurality-count combining for the transmission of binary data. The availability of extra information from the combiner for use with error-correction is discussed. (Author)

AD-627 029 Fld. 9/4
CFSTI Prices: HC $2.00 MF $0.50
PARKE MATHEMATICAL LABS INC CARLISLE MASS
SOME BINARY CODES FOR ERROR-CORRECTION AND SYNCHRONIZATION,

by Eric Myrvaagnes. Oct 65, 32p. Rept. no. Scientific-4
Contract AF19 (628)-3826 Proj. 5628 Task 562801
AFCRL 65-887

Unclassified report

See also AD-621 486.

Descriptors: (*Coding, Errors), Corrections, Information theory

A number of variable-length binary codes are listed, with information about their capabilities for errorcorrection and synchronization. (Author)

AD-627 030 Fld. 9/4
CFSTI Prices: HC $2.00 MF $0.50
PARKE MATHEMATICAL LABS INC CARLISLE MASS
BASIC PROPERTIES OF ERROR-CORRECTING CODES,
by Lorenzo Calabi, and Lester K. Arquette. Nov 65, 38p. Rept. no. Scientific-6
Contract AF19 (628)-3826 Proj. AF-5628 Task 562801
AFCRL 65-888

Unclassified report

Descriptors: (*Coding, Errors), Corrections, Decoding, Information theory

Properties normally considered peculiar either to block codes for noisy channels or else to variablelength codes for noiseless channels are defined in a uniform manner. Among the basic notions are those of correcting ability, decodability and synchronizability; all are formulated for variable length codes over arbitary alphabets for noisy channels. Theorems establish all the logical implications which exist between the properties considered; examples illustrate their differences. (Author)

AD-627 240 Fld. 9/4
CFSTI Prices: HC $5.00 MF $1.00
NEW YORK UNIV N Y LAB FOR ELECTRO-SCIENCE RESEARCH
CORRELATION PROPERTIES OF MULTI-LEVEL CYCLIC SEQUENCES.
Final rept. pt. 2, 1 Sep 64-31 Aug 65,
by Karl N. Levitt. Nov 65, 179p. Rept. no. TR-400-125
Contract DA-31-124-ARO (D)-253 Proj. ARO (D)-4949E
AROD 4949:3

Unclassified report

Rept. on Finite Memory Nonlinear Filtering of Digital Sequences. See also AD-621 801.

Descriptors: (*Statistical functions, Information theory), (*Information theory, Statistical functions), Coding, Data transmission systems, Multiplex, Linear systems, Errors, Probability, Sequential analysis, Synchronization (Electronics), Transmitter-receivers

The report considers the problem of synthesizing cyclic (or periodic) sequences, with binary and nonbinary (N-ary) symbols, for special communication applications. The first part of the report is concerned with the derivation of new classes of sequences. New theoretical developments are presented on the cyclic correlation properties of sequences containing the N (th) complex roots of unity as symbols. The second part is concerned with the application of the sequences derived, as well as other known classes of sequences, to two special communication problems. The first application is a binary asynchronous linear multiplex system. There are k transmitter-receiver pairs, each using sequences (which are summed linearly) as carriers for binary information. Although a particular transmitter is synchronized with the corresponding receiver, the other transmitter-receiver pairs ary asynchronous with this pair. The second application is an N-ary synchronous 'hard-limiting' multiplex system. For this application there are also k transmitter-receiver pairs, although the respective carrier sequences are not summed linearly, but 'hard-limited' prior to transmission.

AD-626 819 See Fld. 9/2

AD-626 820 See Fld. 9/2

AD-627 094 See Fld. 14/2

9/5. SUBSYSTEMS

AD-626 693 Fld. 9/5, 9/3
CFSTI Prices: HC $1.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
OPTIMIZATION OF ANTENNA SYSTEMS.
Research rept.,
by Allan C. Schell. Sep 62, 20p. Rept. no. AFCRL-62-736

Unclassified report

Descriptors: (*Antenna arrays, Optimization), Performance (Engineering), Antenna apertures, Functional analysis, Antenna radiation patterns, Power, Measurement, Theory

A theory for assessing errors in antenna systems and determining the optimum aperture distribution for an intended use is developed. A general error criterion is formulated, and the application of the calculus of variation and constraints intrinsic to antennas results in an integral equation that defines the conditions for the optimum antenna. The method of analysis and optimization derived from this equation is to radiative systems as the Wiener-Hopf equation is to linear time domain systems and the Euler-Lagrange equation is to fields and forces. The theory applies directly to power pattern synthesis, yielding aperture distributions without a priori specification of the farfield phase. A powerful technique for the construction of very-large-aperture antennas is developed. This is the multiplate antenna technique, a method of aperture subdivision that provides flexible antenna performance with economy of cost. The optimization theory and the multiplate antenna technique together provide a means for achieving antennas of large size and high performance that are requisite to significant advances on a wide front of current scientific and military programs. (Author)

AD-626 764 Fld. 9/5, 17/9
CFSTI Prices: HC $4.00 MF $0.75
ADVANCED KINETICS INC COSTA MESA CALIF
INDUCTIVE STORAGE SWITCH STUDY.
Final rept.,
by H. P. Furth, R. W. Waniek, D. M. Fitzgerald, T. Emil, and W. L. Lobdell. Dec 65, 110p. Contract AF30 (602)-3512 Proj. AF-4506 Task 450603
RADC TR-65-297

Unclassified report

Descriptors: (*Interrupters, Pulse modulation), Modulators, Switching circuits, Radar equipment, Electronic switches, Radar pulses, Storage, Mercury, Liquid metals, Magnetic fields, Coils, Powder metals, Iron, Inductance

An 'interrupter' switch was designed and fabricated for use with inductive energy storage devices in pulsed modulator applications. The storage inductor and related circuitry has also been designed keeping in mind the cooling techniques to be employed and the uses of the modulator system. The switch makes use of a low impedance liquid metal - metal contact during the conduction cycle and is opened by a pulsed magnetic field which physically moves the liquid metal away from the solid metal contact. (Author)

AD-626 878 Fld. 9/5, 9/2, 9/1
LINCOLN LAB MASS INST OF TECH LEXINGTON
DIFFERENTIAL INPUT-CONTROLLED GATES OSCILLATOR,
by Yohan Cho. 13 Jul 65, 2p.

Unclassified report

See also AD-616 817.

Availability: Published in Proceedings of the IEEE v53 n10 p1641-2 Oct 1965. Copies to DDC users only.

Descriptors: (*Amplifiers, Computer logic), (*Computer logic, Amplifiers), Digital systems, Tunnel diodes, Gates (Circuits), Oscillators, Relaxation oscillators

The UNIVER circuit has shown versatile logic-circuit properties; these are achieved through the use of a differential amplifier input stage, isolated tunnel diode bistable switches, and reconsituttion of both the dc level and the signal amplitude at the outputs. The UNIVER circuit may be used as a gated oscillator. It is assumed that the differential amplifier input stage has enough gain at the operating frequency to enable it to switch the bistable switching element from the initial reference level to the high level (E (o)) with an input differential voltage (E (o)). The differential input-controlled gated oscillator can be implemented in various ways other than that of the UNIVER configuration. This circuit can be implemented by coupling a differential amplifier to a flip-flop (RS). For a delay element, a simple RC network may be used if the circuit gain is sufficiently high, and the resulting stability of oscillation can be tolerated. In a digital system, the generation of pulse bursts of predetermined lengths may be required, or low-rate random square waves may have to be converted into high-rate pulse trains.

AD-626 890 Fld. 9/5
RADIO CORP OF AMERICA BURLINGTON MASS
PARAMETRIC UPCONVERTER RECEIVING ARRAY,
by H. J. Pratt, and N. G. DaMocogno. 1965, 4p.
Contract AF39 (602)-2115 ,ARPA Order-63-61

Unclassified report

Prepared in cooperation with Lincoln Lab., Mass. Inst. of Tech., Lexington and Raytheon Co., Bedford, Mass.

Availability: Published in The Microwave Journal Dec 1965. Copies to DDC users only.

Descriptors: (*Antenna arrays, Frequency converters), Noise (Radio), Phase, Pumping (Electronics), Phase (Electronics), Antenna radiation patterns, Bandwidth, Gain

The feasibility of the beam steering technique, based on the transmission phase characteristics of the lower sideband parametric upconverter, has been proved. Experimental verification of the technique was provided by measurements made on an S-band linear array receiving system. In addition, evidence supporting the practicability of coherent operation of a relatively large number of upconverters was obtained. The particular receiving system described is strictly a phase system. The wide instantaneous bandwidth of the upconverters could be utilized only if proper time delays were introduced. This could probably be best accomplished by placing the time delays (either at idler or IF) after the upconverters so as not to significantly degrade the noise figure of the system.

AD-626 902 Fld. 9/5
CFSTI Prices: HC $3.00 MF $0.75
SYLVANIA ELECTRONIC SYSTEMS WALTHAM MASS APPLIED RESEARCH LAB
PLASMA-COVERED SLOT ANTENNAS.
Final rept., 1 Nov 62-30 Sep 65,
by J. Galejs, M. Mentzoni, and S. Seshadri. Oct 65, 62p. Rept. no. F-3040-1
Contract AF19 (628)-2410 Proj. AF-4642 Task 464202
AFCRL 65-859

Unclassified report

Descriptors: (*Slot antennas, Plasma sheath), Electrical impedance, Antenna radiation patterns, Admittance, Dielectrics, Temperature, Reentry vehicles, Atmosphere entry, Performance (Engineering), Radiofrequency power, Waveguides, X band

Theoretical studies have led to several formulations of antenna impedances in a plasma environment, the accuracy of which have been verified experimentally. Analytical work is also reported on finite temperature effects on plasma-covered antennas and on antennas in a generally stratified dielectric. An initial study on nonlinear and breakdown effects of signals has been reported. The results of microwave diagnostic studies of electron removal and energy relaxation rates in atmospheric gases are also summarized. (Author)

AD-626 991 Fld. 9/5, 1/3
CFSTI Prices: HC $3.00 MF $0.75
ARINC RESEARCH CORP ANNAPOLIS MD
MAINTAINABILITY PREDICTION BY UNIT FUNCTION.
Interim technical rept. for Nov 64-Oct 65,
by Harold S. Balaban. Dec 65, 74p. Rept. no. 317-02-1-534
Contract AF30 (602)-3387 Proj. AF-5519 Task 551901
RADC TR-65-467

Unclassified report

See also AD-294 457, AD-614 227.

Descriptors: (*Aircraft equipment, Electronic equipment), (*Electronic equipment, Maintainability), Reliability (Electronics), Mathematical prediction, Design, Life expectancy, Time studies

This report presents the results of a study to determine the feasibility of a maintainability prediction-by-function technique. Shop repair-time data representing over 4500 shop maintenance actions on 78 different line replaceable units, categorized into 25 different function types, were collected at Bunker Hill Air Force Base, Indiana. For selected function types, possible maintainability prediction parameters, such as type of maintenance, depth of maintenance penetration, weight, and volume, that would be available during the early design stage were quantified. The relationship between these parameters and observed mean repair times was analyzed through a multiple regression approach. A set of fourteen prediction equations with factors for obtaining confidence limits were obtained. Although these equations have limited applicability because of the restricted sample, the relatively high observed correlations and generally encouraging results of a verification task indicate the feasibility of developing such maintainability prediction-by-function techniques. (Author)

AD-627 085 Fld. 9/5, 9/2
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
SEMICONDUCTOR LIMITERS AS MICROWAVE DUPLEXING DEVICES.
Technical rept.,
by V. J. Higgins, R. Brunton, and G. Hall. Sep 65, 37p. Rept. no. ECOM-2630
Proj. DA-1P6-22001-A-056 Task 1P6-22001-A-056-04

Unclassified report

Prepared in cooperation with Microwave Associates, Inc., Burlington, Mass.

Descriptors: (*Limiters, Duplexers (Electronic)), (*Duplexers (Electronic), Diodes (Semiconductor)), Varactor diodes, Microwave equipment, Electronic switches, X band, Waveguides, Radar equipment, Tests, Test methods, Performance (Engineering)

The report covers the design, development, and evaluation of two X-band semiconductor limiters. The limiters were developed for application as duplexing devices in the man-packed battlefied radar systems AN/PPS-4 and AN/PPS-6. The limiters operate at peak powers of 500 and 1000 wafts over a 500 Mc bandwidth and 0.001 duty cycle. Design and construction of the basic limiter is described, including means of incorporating PIN and varactor diodes in waveguides, together with a technique for achieving passive limiter operation. Test methods and complete test results are given in the electrical evaluation of the limiters as microwave duplexing devices. (Author)

AD-627 136 Fld. 9/5
LINCOLN LAB MASS INST OF TECH LEXINGTON
CORRELATION OF EXPERIMENTAL AND THEORETICAL ACTIVE IMPEDANCES OF A DIPOLE IN AN ARRAY,
by Bliss L. Diamond, and Terry B. Lewis. 8 Mar 65, 3p. Rept. no. JA-2549
Contract AF19 (628)-5167
ESD TDR-65-549

Unclassified report

Availability: Published in IEEE Transactions on Antennas and Propagation vAP-13 n5 p806-7 Sep 1965. Copies to DDC users only.

Descriptors: (*Antenna arrays, Electrical impedance), (*Dipole antennas, Antenna arrays), Theory, Mathematical predictions

Theoretical predictions of the impedance variation with scan angle of a dipole in an array are compared with experimental values obtained from a practical dipole array. Square-grid arrays with 81 and 100 elements were investigated. An 8 x 8 planar arrangement of Butler beam -forming matrices was used to scan the beam. Excellent correlation between the experimental and theoretical active impedances were found in all cases. (Author)

AD-627 141 Fld. 9/5, 17/5, 20/5
CFSTI Prices: HC $2.00 MF $0.50
AUTONETICS ANAHEIM CALIF
STUDY OF INFRARED PARAMETRIC AMPLIFIER.
Quarter progress letter rept. no. 2,
by D. B. Anderson, W. A. McDowell, and R. R. August. 3 Jan 66, 31p. Contract Nonr-4972 (00)
Proj. NR-017-464

Unclassified report

Descriptors: (*Infrared equipment, Parametric amplifiers), (*Parametric amplifiers, Infrared equipment), Feasibility studies, Microwave amplifiers, Semiconductors, Magnetic properties, Waveguides, Dielectric properties, Lasers, Transistors

Some considerations of nonlinear polarization susceptibility in semiconductors and the propagation through various dielectric and depletion layer waveguide structures are reviewed. The results of the device experiments carried out during this reporting period are included as halftone figures within the text. The demonstration of laser radiation propagation through a dielectric image line of dimensions sufficiently small to demonstrate the lowest-order mode of propagation for both transverse electric and magnetic configurations is believed to be the first of its kind.

AD-627 146 Fld. 9/5, 17/2, 9/2
CFSTI Prices: HC $3.00 MF $0.75
LINCOLN LAB MASS INST OF TECH LEXINGTON
DIGITAL FILTER DESIGN TECHNIQUES.
Technical note,
by C. M. Rader, and B. Gold. 23 Dec 65, 71p. Rept. no. TN-1965-63
Contract AF19 (628)-5167 Proj. AF-649L
ESD TDR-65-593

Unclassified report

Descriptors: (*Filters (Electromagnetic wave), Digital systems), Design, Band-pass filters, Networks, Speech compression, Integral transforms, Difference equations

Digital filtering is the process of spectrum shaping using digital components as the basic elements. Increasing speed and decreasing size and cost of digital components make it likely that digital filtering, already used extensively in the computer simulation of analog filters, will perform, in real-time devices, the functions which are now performed almost exclusively by analog components. In this paper, using the z-transform calculus, several digital filter design techniques are reviewed, and new ones are presented. One technique can be used to design a digital filter whose impulse response is like that of a given analog filter; another technique is suitable for the design of a digital filter meeting frequency response criteria. A third technique yields digital filters with linear phase, specified frequency response, and controlled impulse response duration. The effect of digital arithmetic on the behavior of digital filters is also considered. (Author)

AD-626 653 **See Fld. 14/3**

AD-626 733 **See Fld. 9/2**

AD-627 008 **See Fld. 17/9**

AD-627 239 **See Fld. 5/8**

9/6. TELEMETRY

AD-626 903 Fld. 9/6
CFSTI Prices: HC $6.00 MF $1.50
NORTHEASTERN UNIV BOSTON MASS ELECTRONICS RESEARCH LAB
EVALUATION STUDIES OF TELEMETRY SYSTEM COMPONENTS.
Scientific rept.,
by Ronald A. Wagner. 31 Aug 65, 291p. Rept. no. Scientific-2
Contract AF19 (628)-2433

Unclassified report

Descriptors: (*Telemeter systems, Performance (Engineering)), Airborne, Very high frequency, Oscillators, Telemetering transmitters, Tests, Experimental data, Radio equipment

The report contains the results of a program for the evaluation of commercial airborne telemetry system equipment. A number of voltage--controlled subcarrier oscillators and VHF transmitters were tested. Test procedures and results are given for all equipment evaluated. (Author)

AD-627 057 Fld. 9/6, 16/2
CFSTI Prices: HC $4.00 MF $0.75
ALDEN HYDRAULIC LAB WORCHESTER POLYTECHNIC INST MASS
DEVELOPMENT OF A TELEMETRY SYSTEM FOR WATER ENTRY MISSILES,
by Lawrence C. Neale, Alfred H. Barrett, and James A. Wentworth. Dec 65, 103p. Contract NOw-62-0643-d

Unclassified report

Descriptors: (*Telemeter systems, Guided missiles), (*Deceleration, Guided missiles), (*Guided missiles, Deceleration), (*Water entry, Telemeter systems), Underwater, Telemetering transmitters, Accelerometers, Power supplies, Modulators, Tests

In order to study decelerations at water entry and during underwater flight, a missile was built to sense and telemeter this information. The missile was 1.25 inches in diameter and 7.40 inches long with a 30 degree dead rise angle nose cone. It contained an accelerometer, a battery power supply, a modulator, and a transmitter consisting of a one transistor oscillator with buffer and final stages added. The transmitted data was received on a

wide band FM receiver and relayed through a variable filter to an oscilloscope where it was photographed. The telemetry system was electronically calibrated and then checked on a test stand. Water-entry tests were conducted at 75 fps, 100 fps, and 130 fps. At an entry velocity of 75 fps, the recorded peak deceleration was 189 g's which compared quite closely to the theoretical peak deceleration of 185 g's. After 25 milliseconds of underwater flight, the recorded deceleration was 23 g's versus a theoretical deceleration of 18.4 g's. Results of the tests at 100 fps and 130 fps also confirmed that the telemetry system was capable of relaying accurate information on water impact and on underwater flight of the missile. (Author)

AD-627 208 See Fld. 22/2

AD-627 209 See Fld. 22/2

Field 10-ENERGY CONVERSION (NON-PROPULSIVE)

10/1. CONVERSION TECHNIQUES

AD-626 971 Fld. 10/1
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
MOMENT OF RESISTANCE TO ROTATION OF AN ENCLOSED DISC,
by V. S. Sedach. 6 Jan 66, 19p. Rept. no. FTD-TT-65-1809
TT 66-60341
Unclassified report

Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Energetika (USSR) v4 n4 p66-74 1961.

Descriptors: (*Disks, Rotation), (*Turbine parts, Disks),Friction, Moments, Fluid mechanics, USSR

AD-626 941 See Fld. 20/12

10/2. POWER SOURCES

AD-626 858 Fld. 10/2, 13/10
CFSTI Prices: HC $1.00 MF $0.50
WESTINGHOUSE ELECTRIC CORP LIMA OHIO AEROSPACE ELECTRICAL DIV
100 WATT THERMOELECTRIC POWER SYSTEM FOR BUOY APPLICATIONS.
Monthly progress rept. no. 19, 11 Dec 65-11 Jan 66.
11 Jan 66, 5p. Contract N600(61533)61992
Unclassified report

Descriptors: (*Thermoelectricity, Buoys), (*Buoys, Power supplies), Thermocouples, Chromium alloys, Nickel alloys, Aluminum alloys, Temperature, Heat sinks, Generators, Performance (Engineering), Heaters, Electric power production, Energy conversion

A test was run after incorporation of burner modifications to check the effects of these modifications. Since the heated water supply used previously was not available for this test, tap water at 50 = 5F was used in the water cooled copper plates. The hot core temperature was lowered approximately 90F to give a temperature difference across the generator approximately equal to that expected during hot day operation with 95F sea water. This lowering of the temperature range results in a slightly higher output from the low temperature thermoelectric modules. This is caused by a higher thermoelectric material efficiency in this lower temperature range. Under these conditions the power output was 119.8 watts at 24 volts. The open circuit voltage was 49.6 volts. Correcting for the higher thermoelectric material efficiency gives a predicted output of 111.8 volts at 24 volts and an open circuit voltage of 48.5 volts. The waste heat sink to be mounted in the hull of the buoy was redesigned.

AD-627 037 Fld. 10/2
CFSTI Prices: HC $2.00 MF $0.50
AVCO EVERETT RESEARCH LAB EVERETT MASS
PERFORMANCE OF A SELF-EXCITED MHD GENERATOR.
Research rept.,
by Arne C. J. Mattsson, Edward L. Ducharme, Edward M. Govoni, Irving B. Morrow,Jr., and Thomas R. Brogan. Oct 65, 37p. Rept. no. Avco RR-238
Contract AF33(615)-1862
Unclassified report

Presented at the International Conference on Energetics, University of Rochester, N. Y. 18-20 Aug 1965.

Descriptors: (*Magnetohydrodynamic generators, Performance (Engineering)), Electrodes, Magnets, Power supplies, Rocket motors, Tests

A rocket-driven self-excited MHD generator designed for a net power output of 20,000 kilowatts was successfully operated. The generator was designed to demonstrate the feasibility of using an MHD device to provide power for limited duration at very high levels with relatively simple equipment. The paper is a general description of the generator and the experimental results of a testing program performed to study the characteristics of self-excitation and the combined operation of self-excitation and power output.

AD-627 083 Fld. 10/2, 9/2
CFSTI Prices: HC $4.00 MF $0.75
DELAWARE UNIV NEWARK
MAGNETIC AND AERODYNAMIC NOISE OF HIGH SPEED ALTERNATING CURRENT GENERATORS AND THEORY OF HOMOPOLAR ALTERNATORS. MANUAL FOR FLUX DISTRIBUTIONS IN HOMOPOLAR INDUCTOR ALTERNATORS.
Final rept. on phase B, pt. 8,
by K. K. Surti, and Edward A. Erdelyi. Jul 64, 116p. Contract DA-44-009-eng-4830 Proj. DA-8M18-16-001-01
Unclassified report

Descriptors: (*Instruction manuals, Programming (Computers)), (*Programming (Computers), Magnetic properties), (*Generators, Alternating current), Aerodynamic characteristics, Theory

10/3. ENERGY STORAGE

AD-627 215 Fld. 10/3, 7/4
CFSTI Prices: HC $3.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
HIGH ENERGY ELECTROCHEMICAL BATTERY SYSTEMS USING ORGANIC ELECTROLYTES.
Technical rept.,
by Howard R. Knapp. Oct 65, 55p. Rept. no. ECOM-2632
Proj. DA-1C0-14501-A-34A Task 1C0-14501-A-34A-01
Unclassified report

Descriptors: (*Batteries + components, Organic materials), (*Electrolytes, Organic materials), (*Organic materials, Electrolytes), (*Electrodes, Materials), Anodes (Electrolytic cells), Cathodes (Electrolytic cells), Feasibility studies, Electrochemistry, Lithium, Sulfoxides, Chromium compounds, Iodine compounds, Molybdenum compounds, Vanadium compounds, Oxides

Electrochemical studies on high energy anode and cathode materials coupled in organic electrolytes were undertaken to determine the feasibility of producing batteries superior to aqueous systems in the areas of (1) higher energy density per unit weight and volume, (2) wider temperature range of operation than aqueous batteries, and (3) lower operating temperature than aqueous batteries. The report covers the selection of couples for study in organic electrolytes. Statistical evaluation of half cell potential data at room temperature has disclosed inorganic acid anhydrides to be promising cathode materials in several organic electrolytes. Preliminary cell studies using lithium anodes, dimethyl sulfoxide electrolytes and acid anhydride cathode materials such as chromium trioxide, iodine pentoxide, molybdic oxide and vanadium pentoxide were to characterize electrochemical performance of these materials. (Author)

AD-627 216 See Fld. 7/4

AD-627 248 See Fld. 7/4

Field 11-MATERIALS

11/1. ADHESIVES AND SEALS

AD-626 960 Fld. 11/1
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
GLUES FROM SYNTHETICS,
by T. Fetisov. 21 Dec 65, 11p. Rept. no. FTD-TT-65-1329
TT 66-60330
Unclassified report

Unedited rough draft trans. of Nedelya (USSR) 19 Dec 64 p16.

Descriptors: (*Adhesives, Polymers), Adhesion, Honeycomb cores, Metal joints, Textiles, Bone, Reviews, USSR

A popularized discussion concerning the use of synthetic polymers as adhesives.

AD-627 230 Fld. 11/1, 13/7
CFSTI Prices: HC $1.00 MF $0.50
NAVY MARINE ENGINEERING LAB ANNAPOLIS MD
SELF-LUBRICATED SEALS DEVELOPMENT FOR HIGH-PRESSURE, OIL-FREE COMPRESSORS.
Phase rept.,
by John R. Ward. Jan 66, 23p. Rept. no. mel-399/65
Proj. S-F013-08-05 Task 4090
Unclassified report

Descriptors: (*Seals (Stoppers), High-pressure compressors), (*Plastic seals, High-pressure compressors), Gas seals, Halogenated hydrocarbons, Pistons, Materials, Wear resistance, Life expectancy

Continued progress in the development of self-lubricated piston and rod seals for oil-free, high-pressure air compressors is described. Seal material characteristics based on filled polyetrafluoroethylene (PTFE) as well as new, potentially improved seal materials are discussed. Piston speeds up to 450 feet per minute were investigated. Wear results from several long-term tests at 4500 and 5000 pounds per square inch are shown. A useful piston seal life exceeding 2000 hours was demonstrated. (Author)

AD-626 847 See Fld. 11/9

AD-627 087 See Fld. 6/12

AD-627 210 See Fld. 7/3

11/2. CERAMICS, REFRACTORIES, AND GLASSES

AD-627 139 Fld. 11/2, 22/2, 11/3
CFSTI Prices: HC $6.00 MF $1.25
IIT RESEARCH INST CHICAGO ILL
EVALUATION OF THERMAL PROTECTIVE SYSTEMS FOR ADVANCED AEROSPACE VEHICLES, VOLUME I.
Interim summary rept., Sep 62-Dec 63,
by W. J. Christian, J. L. Bliton, J. W. Dally, J. C. Hedge, and H. J. Hirschhorn. Apr 65, 259p.
Contract AF33 (657)-9407 Proj. AF-651G
AFML TDR-64-204-Vol-I
Unclassified report

See also AD-627 140.

Descriptors: (*Aerospace craft, Thermal insulation), (*Refractory materials, Aerospace craft), Compatibility, Thermal properties, Mechanical properties, Cermets, Thermal conductivity, Refractory coatings, Plasma medium, Flame spraying, Thermal radiation, Thermal expansion, Evapotranspiration, Aluminum compounds, Oxides, Nickel, Zirconium compounds, Nickel alloys, Chromium alloys, Magnesium compounds, Cooling, Porous metals, Hafnium compounds, High-temperature research

The report contains summaries of: Surveys of the literature on structural and design aspects of thermal protection systems, on compatibility of refractory materials, on thermal and mechanical properties of refractory materials, and on methods for measuring emittance of materials at high temperature. Experimental determination of the thermal conductance of plasma sprayed coatings of alumina-nickel and zirconiaNichrome types. Measurements of total normal emittance of materials in an oxidizing atmosphere at temperatures of 1000 to 4000F. Experimental investigations of the effects of composition on the thermal expansion and total normal emittance of zirconia and magnesia. Analytical and experimental studies of the general characteristics and weight requirements of transpiration cooled nose caps using porous metal surfaces. (Author)

AD-627 140 Fld. 11/2, 22/2, 11/6, 11/3
CFSTI Prices: HC $8.80 MF $2.25
IIT RESEARCH INST CHICAGO ILL
EVALUATION OF THERMAL PROTECTIVE SYSTEMS FOR ADVANCED AEROSPACE VEHICLES. VOLUME II: APPENDICES.
Interim summary rept., Sep 62-Dec 63,
by W. J. Christian, J. L. Bliton, J. W. Dally, J. C. Hedge, and H. J. Hirschhorn. Apr 65, 579p.
Contract AF33 (657)-9407 Proj. AF-651G
AFML TDR-64-204-Vol-2
Unclassified report

See also AD-627 139.

Descriptors: (*Aerospace craft, Thermal insulation), (*Refractory materials, Aerospace craft), Tables, Graphics, Aluminum compounds, Oxides, Beryllium compounds, Hafnium compounds, Thorium compounds, Magnesium compounds, Spinels, Zirconium compounds, Nitrides, Carbides, Borides, Test equipment, Test methods, Brittleness, Molybdenum compounds, Silicides, Graphite, Niobium, Molybdenum, Tantalum, Tungsten, Refractory metal alloys, Refractory metals, Thermal properties, Mechanical properties, Thermal conductivity, Thermal radiation, Thermal expansion, Specific heat

Contents: Compilation of thermal and mechanical properties of refractory materials; Survey of methods of measuring emittance; Description of radiation measuring system.

AD-626 701 **See Fld. 11/6**

AD-626 743 **See Fld. 20/5**

AD-626 922 **See Fld. 13/3**

AD-626 944 **See Fld. 1/5**

AD-626 995 **See Fld. 13/13**

AD-627 045 **See Fld. 1/5**

AD-627 174 **See Fld. 20/2**

AD-627 177 **See Fld. 13/13**

AD-627 232 **See Fld. 20/2**

AD-627 237 **See Fld. 7/4**

11/3. COATINGS, COLORANTS, AND FINISHES

AD-627 006 Fld. 11/3, 11/6, 13/8
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ELECTROLYTIC SILICONIZING OF MOLYBDENUM FROM FUSED SALTS,
by E. N. Shchetnikov, and G. I. Belyaeva. 13 Jan 66, 13p. Rept. no. FTD-TT-65-1454
TT 66-60350
Unclassified report

Unedited rough draft trans. of Zhurnal Prikladnoi Khimii (USSR) v38 n1 p197-201 1965.

Descriptors: (*Molybdenum, Silicon coatings), (*Silicon coatings, Electrodeposition), (*Electrodeposition, Silicon coatings), Corrosion inhibition, Coatings, Electrolysis, Molybdenum compounds, Silicides, Thickness, USSR

A mode of operation was developed for electrolytical siliconizing of molybdenum in a fusion: temperature 1100C, density of current 0.3 amp/sq. cm, and time 4 to 6 hours. A compact smooth coating was thus obtained on the molybdenum which consisted of disilicide of molybdenum MoSi2. An electrolytic coating of a thickness of 50 microns assures protection of the molybdenum against oxidation at a temperature of 1600C for 7 to 10 hours. (Author)

AD-627 139 **See Fld. 11/2**

AD-627 140 **See Fld. 11/2**

AD-627 255 **See Fld. 13/8**

11/4. COMPOSITE MATERIALS

AD-627 173 Fld. 11/4, 11/6
CFSTI Prices: HC $1.00 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE AEROELASTIC AND STRUCTURES RESEARCH LAB
MECHANICAL BEHAVIOR OF COMPOSITE MATERIALS.
Progress rept.; Final summary rept.,
by James W. Mar, and Lawrence A. Shepard. 1 Sep 65, 14p. Rept. no. TR-94-6 ,DSR-8434
Contract AF49 (638)-775 Proj. AF-9782 Task 978202
AFOSR 65-1936
Unclassified report

Descriptors: (*Composite materials, Mechanical properties), (*Powder alloys, Mechanical properties), Ductility, Deformation, Silver, Lead, Steel, Joints, Sintering, Copper alloys, Tungsten alloys, Iron alloys, Nickel alloys, Silver alloys, Fracture (Mechanics), Fibers, Filaments, Thermal properties

A study was conducted to develop an understanding of the interaction of stronger and more ductile phases in determining the mechanical behavior and fracture of metallic composites. It was directed to composites in which the strong phase constituted the major volume fracture. The following aspects were particularly emphasized: (1) the relationship of the properties of individual phases to their behavior in a composite; (2) the effect of the shape, size and volume fraction, distribution, and spacing of the phases upon the properties; and (3) the thermodynamic properties, i.e., phase relationships solubilities, and interfacial tensions of the composites.

AD-626 847 **See Fld. 11/9**

AD-627 047 **See Fld. 11/7**

AD-627 089 **See Fld. 1/3**

11/5. FIBERS AND TEXTILES

AD-626 848 Fld. 11/5
CFSTI Prices: HC $1.00 MF $0.50
STEVENS (J P) AND CO INC GREER S C SYNTHETIC DIV
DEVELOPMENT OF SHADE STANDARD AND SHADE TOLERANCES, WOOL/POLYESTER CLOTH, SHADE BLUE 1084, PIECE DYED CONFORMING TO TYPE III OF SPECIFICATION MIL-C-21115B.
Final rept., Jun 63-Dec 64,
by Chuck Spann. Jul 65, 24p. Contract AF33 (657)-12103 Proj. AF-6314 Task 631401
SEG TR-65-38
Unclassified report

Descriptors: (*Dyes, Textiles), (*Textiles, Air Force), Woolen textiles, Fibers (Synthestic), Polyester plastics, Mixtures, Standards, Test methods, Specifications

The purpose of this project was to develop shade standards and eight tolerances of Air Force Blue 1084 in polyester wool fabric conforming to Type III of Specification MIL-C-21115B or a blend modification that would match standard all-wool fabric in Blue 1084. The composite number of shades to produce the required color was established through various laboratory procedures. The methods of preparing the fabric before dyeing, piece dyeing of standard and tolerances, finishing procedures and a laboratory analysis are included. The feasibility of piece dyeing polyester wool fabric conforming to Specification MIL-C-21115B is practical under the conditions presented in the report. However, small preproduction yardage should be dyed and tested before proceeding with production. (Author)

11/6. METALLURGY AND METALLOGRAPHY

AD-626 701 Fld. 11/6, 11/2, 11/9, 11/7, +
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
NEW MATERIALS IN ENGINEERING,
by E. I. Belskii. 1965, 20p. Rept. no. Translation-1089
TT 66-60266
Unclassified report

Trans. of mono. Akademiya Navuk BSSR, Minsk 1964 p3-9, 43-55.

Descriptors: (*Materials, Engineering), USSR, Metals, Radioactivity, Heat-resistant materials, Radioactive isotopes, Reactor materials, Plastics, Titanium, Powder metallurgy

Contents: The Most Important Trends in Science and Engineering and New Materials; rare materials and titanium; materials of nucleonics and radioactive isotopes; materials and powder products; polymer materials, plastics.

AD-626 774 Fld. 11/6
CFSTI Prices: HC $2.00 MF $0.50
DOUGLAS AIRCRAFT CO INC SANTA MONICA CALIF MISSILE AND SPACE SYSTEMS DIV

IMPROVED ELECTRON FRACTOGRAPHIC TECHNIQUES. VOLUME II.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 65,
by B. V. Whiteson, V. Kerlins, and A. Phillips.
14 Jan 66, 38p. Rept. no. Rept. no. SM-49150
Contract AF33 (615)-3014

Unclassified report

Descriptors: (*Fractography, Metals), (*Electron microscopy, Fractography), Electron microscopes, Fatigue (Mechanics), Fracture (Mechanics), Corrosion, Stresses, Hydrogen embrittlement, Steel, Tritium, Heat treatment, Mechanical properties, Cadmium

Improved techniques for use of the electron microscope in fractographic analysis are sought. The program is divided into 3 tasks: Determination of the direction of rapid-crack propagation in metal fractures; determination of the characteristics distinguishing stress corrosion from hydrogen embrittlement; and investigation of the correlation between fatigue striation spacing and stress environment. Most of the mechanical tests for the 3 tasks were completed. The most promising technique for correlation of fracture features with direction of crack propagation was replication of the fracture surface adjacent to the edge. Consistent orientation appears between tear dimple (a dimple open to the edge) and the fracture direction near the edge. Shear dimples which are closed to the fracture edge have inconsistent correlation to fracture direction. Dimples located near the center of the fracture are either equiaxed or randomly oriented so that they show no apparent correlation to fracture direction.

AD-626 832 Fld. 11/6
CFSTI Prices: HC $2.00 MF $0.50
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA
ENERGY ABSORPTION PROPERTIES OF CELLULAR ALUMINUM,
by Samuel Lipson. Nov 65, 41p.
FA R-1784

Unclassified report

Descriptors: (*Aluminum alloys, Foamed metals), (*Foamed metals, Aluminum alloys), Compressive properties, Porous metals, Loading (Mechanics), Kinetic energy, Deformation, Density

The scope of this study covers the optimization of materials and structures of cellular aluminum with respect to applications requiring controlled dissipation of kinetic energy. A design of a linear energy dissipation system is suggested, and its effective operation demonstrated. Conclusions are presented relative to the effect of material properties on energy dissipation characteristics. (Author)

AD-626 869 Fld. 11/6, 20/2
NORTHWESTERN UNIV EVANSTON ILL DEPT OF MATERIALS SCIENCE
THE INFLUENCE OF POINT DEFECTS UPON THE COMPRESSIVE STRENGTH OF NI-AL,
by E. P. Lautenschlager, D. A. Kiewit, and J. O. Brittain. 20 Feb 64, 6p. Contract AF49 (638)-436
AFOSR 65-1995

Unclassified report

Availability: Published in Transactions of The Metallurgical Society of Aime v233 p1297-1302 Jul 1965. Copies to DDC users only.

Descriptors: (*Nickel alloys, Aluminum alloys), (*Aluminum alloys, Nickel alloys), (*Crystal lattice defects, Intermetallic compounds), (*Compressive properties, Intermetallic compounds), Fracture (Mechanics), Grain structures (Metallurgy), Deformation, Stresses

Compression tests were run in the temperature range of 700 to 900 C on beta phase NiAl intermetallic alloys of several grain sizes. At these temperatures the minimum strengths were observed at the stoichiometric composition. While significant increases in strength occurred in both the low-nickel (vacancy) and high-nickel (substitutional) regions, the highest strengths were found in the high-nickel region. During deformation serrated flow was sometimes observed in the low-nickel alloys. After deformation transgranular cracking and deformation striations were observed in all compositions tested. (Author)

AD-626 895 Fld. 11/6, 20/2, 20/11
CLARKSON COLL OF TECHNOLOGY POTSDAM N Y DEPT OF PHYSICS
BEHAVIOR OF YOUNG'S MODULUS OF A BETA BRASS SINGLE CRYSTAL FOR VARIOUS QUENCH TEMPERATURES,
by M. C. Martin, and H. E. Camp. 7 Dec 64, 6p.
Contract AF-AFOSR-62-254 Proj. AF-9763
Task 976301
AFOSR 65-1926

Unclassified report

Availability: Published in Journal of Applied Physics v36 n7 p2154-7 Jul 65. Copies to DDC users only.

Descriptors: (*Brass, Elasticity), Single crystals, Quenching (Cooling), Temperature, Measurement

The standard direct strain method was used to determine the effect on Young's modulus of quenching beta brass in a saturated salt solution. The measurements were made on one beta brass single crystal with orientation function f (1, m, n) = 0.121. The measurements were performed at the temperatures of 25, - 30, - 90, and -196C. From the measurements the reciprocal of Young's modulus was calculated and 2 anomalous points were determined. The increase in Young's modulus for the quench temperature of 275C was attributed to isolated wrong pairs of atoms. The increase in Young's modulus at the quench temperature of 450C was attributed to disorder being quenched in. (Author)

AD-626 961 Fld. 11/6, 20/9
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
PLASMA JET ATOMIZATION OF MOLYBDENUM,
by A. N. Krasnov. 13 Jan 66, 12p. Rept. no.
FTD-TT-65-1381
TT 66-60331

Unclassified report

Unedited rough draft trans. of Poroshkovaya Metallurgiya (USSR) v5 n3 p1-5 1965.

Descriptors: (*Powder metallurgy, Plasma jets), (*Molybdenum, Atomization), (*Plasma jets, Powder metals), USSR, Particle size

The results are presented of an investigation of the effect of variable parameters of the process of plasma atomization on the granulometric composition of the resulting molybdenum powder. (Author)

AD-626 964 Fld. 11/6
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
EFFECT OF ALLOYING ON THE TEMPERATURE DEPENDENCE OF THE NORMAL MODULUS OF THE ELASTICITY OF TITANIUM,
by S. F. Kovtun, and R. A. Ulyanov. 13 Jan 66, 13p. Rept. no. FTD-TT-65-1462
TT 66-60334

Unclassified report

Unedited rough draft trans. of Fizika Metallov i Metallovedenie (USSR) v19 n2 p263-7 1965.

Descriptors: (*Titanium alloys, Elasticity), USSR, Aluminum alloys, Chromium alloys, Molybdenum alloys, Rhenium alloys, Lanthanum alloys, Tellurium alloys, Plasticity, Metallurgy

The investigations carried out showed that the best allowing elements from the point of view of raising the modulus of elasticity of titanium are Al, Cr, Mo, and Re. In this situation the concentration of the alloying elements should not exceed their solubility in the alpha phase. Lanthanum and tellurium, which lower the modulus of elasticity of titanium, noticeably increases its plasticity at low temperatures (the relative lengthening at -196 amounts to 35 - 40%, whereas with pure titanium, it does not go higher than 27%). (Author)

AD-626 966 Fld. 11/6
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ELECTROSLAG MELTING OF MONEL METAL,
by E. M. Lekarenko, G. N. Pokrovskaya, and K. P. Chernykh. 4 Jan 66, 7p. Rept. no. FTD-TT-65-1465
TT 66-60336

Unclassified report

Unedited rough draft trans. of Tsvetnye Metally (USSR) v37 n9 p90-1 1964.

Descriptors: (*Nickel alloys, Melting), (*Metallurgy, Nickel alloys), USSR, Copper alloys, Metal plates, Surface properties, Electrodes

AD-626 990 Fld. 11/6
CFSTI Prices: HC $2.00 MF $0.50
DAYTON UNIV OHIO
X-RAY DIFFRACTION STUDY OF THE OXIDATION OF TA, NB, AND SOME NB ALLOYS AT ATMOSPHERIC PRESSURE.
Rept. for Jun 62-Jul 65,
by Robert Nunemacher. Nov 65, 32p. Contract AF33 (657)-8553 Proj. AF-7360 Task 736005
AFML TR-65-332

Unclassified report

Descriptors: (*Tantalum, Oxidation), (*Niobium, Oxidation), (*Niobium alloys, Oxidation), (*Oxidation, Refractory metals), Powder metals, X-ray diffraction analysis, Phase studies, High-temperature research, Niobium compounds, Oxides, Tungsten alloys, Zirconium alloys, Titanium alloys, Corrosion resistance, Refractory metal alloys

The oxidation characteristics of niobium and tantalum powders and niobium, tantalum and certain niobium alloys were determined by x-ray diffraction techniques. The various color changes in the suboxide range of the powders during air oxidation were investigated. Diffraction data is given for the low temperature alpha and for the high temperature beta Nb205 phases. No new gamma phase of Nb205 formed after extensive heating at 800C. Oxidation rates are reported for Nb and Ta sheet and three Nb alloys: CB-752 (10 W, 2.5 Zr), D-43 (10 W, 1 Zr), and D-36 (10 Ti, 5 Zr). The D-36 alloy exhibited the greatest resistance to oxidation. (Author)

AD-627 081 Fld. 11/6, 20/3, 20/13
CFSTI Prices: HC $3.00 MF $0.75
NOTRE DAME UNIV IND
AN EXPERIMENTAL DETERMINATION OF THERMODYNAMIC AND ELECTRICAL PROPERTIES OF STRONTIUM ON TUNGSTEN.
Technical rept.,
by R. H. Dittman, A. A. Petrauskas, and E. A. Coomes. 1965, 66p. Contract Nonr-1623 (01)
Proj. NR-372-731

Unclassified report

Presented in part at the Field Emission Symposium (12th), Pennsylvania State Univ., Sep 7-11 1965.

Descriptors: (*Strontium, Electrical properties), (*Thermodynamics, Strontium), (*Tungsten, Surface properties), Substrates, Absorption, Heat of activation, Work function, Field emission, Electron microscopy, Thermal properties, Sorption, Polarization, Graphics

The field electron microscope was used for the precise determination of thermodynamic and electrical properties of Sr adsorbed on W. For Sr coverages above theta nearly equal to 0.70 the Sr adlayer exhibits bulk properties. Below theta nearly equal to 0.20 Sr is probably adsorbed in the ionic state. Between theta nearly equal to 0.20 and theta nearly equal to 0.70 there is a mixture of ionic surface properties and bulk properties in the adsorbed Sr. At a characteristic, or isokinetic temperature of 1350K the rate of thermal desorption of Sr from W is independent of Sr coverage theta. (Author)

AD-627 111 Fld. 11/6
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ELECTROSLAG REMELTING DESERVES CONSTANT ATTENTION.
4 Jan 66, 7p. Rept. no. FTD-TT-65-1464
TT 66-60370

Unclassified report

Unedited rough draft trans. of Metallurg (USSR) v9 n8 p21 1964.

Descriptors: (*Steel, Refining (Metallurgy)), (*Refining (Metallurgy), Steel), USSR, Melting, Vacuum apparatus, Production

AD-626 785 See Fld. 20/13

AD-626 863 See Fld. 20/12

AD-626 891 See Fld. 20/12

AD-626 941 See Fld. 20/12

AD-626 986 See Fld. 20/11

AD-626 988 See Fld. 13/5

AD-626 989 See Fld. 13/5

AD-626 994 See Fld. 13/5

AD-627 006 See Fld. 11/3

AD-627 019 See Fld. 20/11

AD-627 061 See Fld. 13/5

AD-627 101 See Fld. 13/8

AD-627 105 See Fld. 7/4

AD-627 140 See Fld. 11/2

AD-627 171 See Fld. 20/2

AD-627 173 See Fld. 11/4

AD-627 225 See Fld. 7/2

AD-627 226 See Fld. 7/2

AD-627 255 See Fld. 13/8

11/7. MISCELLANEOUS MATERIALS

AD-626 980 Fld. 11/7, 13/2, 1/5
CFSTI Prices: HC $5.00 MF $1.00
OHIO RIVER DIV LABS MARIEMONT RIGID PAVEMENT LAB
REPORT OF AGGREGATE AVAILABILITY SURVEY IN CONTINENTAL UNITED STATES.
Dec 52, 159p.

Unclassified report

Descriptors: (*Landing fields, Pavements), (*Pavements, Materials), (*Materials, Pavements), Lime, Sand, Gravel, Slags, Rock (Geology), United States, Air Force

The study has encompassed the major sources of aggregates for construction purposes in the Continental United States. In the accumulation of the data, information was obtained from all known available sources including the major construction agencies of the Federal Government, State Highway Departments, and recently published compilations such as 'Pit an Quarry Handbook'. The data are presented separately for each State, and is believed sufficiently complete at this time to be of considerable value as a reference for current general construction, as well as a guide for airfield pavement construction, especially when considering special pavements resistant to heat and blast of jet and rocket motor exhausts. (Author)

AD-627 047 Fld. 11/7, 11/4
CFSTI Prices: HC $6.00 MF $1.25
OHIO RIVER DIV LABS MARIEMONT
ANNOTATED BIBLIOGRAPHY CONCERNING AGGREGATES 1940-1950.
Jan 53, 218p.

Unclassified report

Descriptors: (*Bibliographies, Materials), (*Materials, Concrete), Indexes, Abstracts, Ceramic materials, Rock (Geology), Addives, Physical properties, Thermal properties, Composite materials

This is a compilation into one publication, of articles on heavy aggregate published between the years 1940 to 1950 inclusive. There is no assurance that all articles published during this period are included in this report. Articles dealing with lightweight aggregates are not included. No attempt has been made to limit the articles to any one phase of investigation. An examination of the table of contents gives the maln headings under which the bibliography is arranged, and an idea of the scope of the report. In addition, a detailed index is included to enable the user to refer quickly to articles listed. The abstracts are numbered, and these numbers are used in the index to enable the user to find the article. The 'Author Index' also uses the abstract numbers to aid the user in locating articles if searched for by author. (Author)

AD-627 170 Fld. 11/7, 20/13
CFSTI Prices: HC $2.00 MF $0.50
MIDWEST RESEARCH INST KANSAS CITY MO
MATERIALS RESEARCH FOR HEAT TRANSFER FLUIDS.
Rept. for Feb 64-Mar 65,
by Karl R. Mecklenberg. Dec 65, 45p. Contract AF33 (657)-10295 Proj. AF-7343 ,AF-7340 Task 734302 ,734008
AFML TDR-64-16-Pt-3

Unclassified report

Descriptors: (*Liquid metal coolants, Sodium), (*Sodium, Heat transfer coefficients), Condensation, Coolants, Boilers, Aerospace craft, Stainless steel, Heat transfer

Liquid metals have certain properties that make them candidates for heat transfer use in aerospace systems. The objective of the investigation was to determine the magnitude of the heat transfer coefficient of condensation for sodium. The supplementary work with the larger, Type 347 stainless steel boilers is presented, including the description of the boilers and operating procedure. The heat transfer experiments were conducted in a closed boiler system, in which the sodium was boiled in the lower region and condensed upon an instrumented surface in the upper region. The results of the operation are presented, showing the heat transfer coefficient for condensing sodium to be between 65.9 and 951.6 Bty/hr-sq ft-degrees F for the conditions studied. These heat transfer coefficients are lower than predicted and there is no apparent correlation in the data. The large data scatter and low coefficient values were attributed to the random formation of condensate (in which case condensation may occur on only a portion of the total condensing area) and the larger resistivity to heat transfer through the additional condensate layer. (Author)

AD-626 701 See Fld. 11/6

11/8. OILS, LUBRICANTS, AND HYDRAULIC FLUIDS

AD-626 977 Fld. 11/8
CFSTI Prices: HC $5.00 MF $1.00
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
MOTOR AND JET OILS AND FLUIDS (SELECTED CHAPTERS),
by K. K. Papok, and E. G. Semenido. 29 Dec 65, 151p. Rept. no. FTD-MT-64-382
TT 66-60347

Unclassified report

Edited machine trans. of mono. Motornye i Reaktivnye Masla i Zhidkosti, Izdatelstvo Khimiya, Moscow., 1963 p123-39, 224-36, 391-8, 411-62, 544-52, 673-91.

Descriptors: (*Oils, Physical properties), (*Lubricants, Physical properties), (*Coolants, Internal combustion engines), Lubricant additives, Airplane engine oils, Plastics, Viscosity, Diesel engines, Turbojet engines, Turboprop engines, Gas turbines, Rocket motors, USSR

Contents: Viscosity additives, Multifunctional additives, Diesel oils, Oils for turbojet and turboprop engines, Oils for gas turbines, Oils for rocket engines, Plastic lubricants and their structure, and Liquids for engine-cooling systems.

11/9. PLASTICS

AD-626 788 Fld. 11/9, 13/3
CFSTI Prices: HC $2.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
THE MANUFACTURE OF PLASTICS AND THEIR APPLICATION IN CONSTRUCTION,
by E. M. Smorodin, and K. Kokanov. Dec 65, 27p. Rept. no. FSTC-381-T65-530
TT 66-60284

Unclassified report

Trans. of mono. Kiev (USSR) n6.

Descriptors: (*Plastics, Construction), (*Construction, Plastics), USSR, Polyvinyl chloride, Styrene plastics, Floors, Adhesives, Sheets, Production, Buildings, Housing, Economics

AD-626 847 Fld. 11/9, 11/1, 11/4, 7/3
CFSTI Prices: HC $4.00 MF $0.75
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
INVESTIGATION OF CATALYTIC THERMAL OXIDATIVE DEGRADATION OF ORGANIC POLYMERS AT ELEVATED TEMPERATURES.
Technical rept.,
by D. G. Flom, A. L. Speece, and G. A. Schmidt. Jul 65, 122p. Contract AF33 (657)-11240 Proj. 7342 Task 734202
AFML TR-65-235

Unclassified report

Descriptors: (*Polymers, Degradation), (*Adhesives, Degradation), (*Composite materials, Degradation), Oxidation, Catalysis, Metal coatings, Epoxy plastics, Phenolic plastics, Benzimidazoles, Aluminum, Iron, Stainless steel, Powder metals, Mass spectroscopy, Neutron activation analysis, Infrared spectroscopy, Paramagnetic resonance, Chemiluminescence, Chromatographic analysis, High-temperature research

The basic mechanisms of degradation or organic polymers at elevated temperatures in contact with certain metals were investigated. The areas of study included migration of metal into polymers, the role of metal oxide films in degradation, polymer-metal reactions, and inhibition of degradation by the use of inert metal coatings. The polymers considered were epoxies, phenolics, and polybenezimidazole. The metals used were aluminum, iron, and stainless steel. Composite configurations evaluated were lap shear specimens and fine metal powders dispersed in the polymers. The experimental techniques used included mass spectrometry, neutron activation analysis, infrared absorption, electron paramagnetic resonance, thermochemiluminescence, and vapor phase chromatography. (Author)

AD-627 049 Fld. 11/9, 18/8
CFSTI Prices: HC $2.00 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD
THE EFFECT OF RADIATION ON THE ELECTRICAL RESISTIVITY AND BULK COMPRESSIBILITY OF POLYEPOXIDES.
Summary rept.,
by R. W. Warfield, and C. V. Kincaid. 13 Dec 65, 30p. Rept. no. NOLTR-65-125
Task RRMA-03-071/212-1/R007-03-01
Unclassified report

Descriptors: (*Epoxy plastics, Radiation damage), Gamma rays, Neutrons, Degradation, Resistance (Electrical), Compressive properties

Three polyepoxides were exposed to varying doses of mixed neutron and gamma radiation in the University of Maryland nuclear reactor. Before irradiation, the electrical volume resistivity and the bulk compressibility of each of the polymers were determined as a function of temperature. The changes produced in these two parameters by radiation doses up to 25 Mrads were progressively followed by measurements after each radiation cycle. The results of this study indicate that radiation of this type and intensity will degrade crosslinked polyepoxides and that this can be shown by electrical resistivity measurements and by changes in the bulk compressibility. (Author)

AD-626 701 **See Fld. 11/6**

AD-626 790 **See Fld. 8/2**

AD-627 060 **See Fld. 7/2**

AD-627 087 **See Fld. 6/12**

AD-627 249 **See Fld. 13/10**

11/10. RUBBERS

AD-626 697 Fld. 11/10
CFSTI Prices: HC $2.00 MF $0.50
ARMY WEAPONS COMMAND ROCK ISLAND ILL RESEARCH AND ENGINEERING DIV
TWO YEAR AGING OF ELASTOMERIC VULCANIZATES IN PANAMA, ALASKA AND ILLINOIS.
Technical rept.,
by E. W. Bergstrom. Sep 65, 32p. Proj. DA-1C024401A110
RIA 65-2374
Unclassified report

Descriptors: (*Elastomers, Aging (Materials)), (*Vulcanizates, Aging (Materials)), Panama, Illinois, Alaska, Environmental testing, Experimental data, Antioxidants, Ozone, Test methods

Vulcanizates prepared from commercially available elastomers, many of which have been introduced since 1955, were exposed outdoors at Ft. Wainwright, Alaska, Rock Island, Illinois and the Panama Canal Zone to compare the effects of arctic, temperate and tropic environments over a ten year period. Unstressed test pads and bent loop oxone specimens were used. Results after two years indicate that aging is generally more severe in Panama than in Alaska or Rock Island, although some vulcanizates have shown excellent aging resistance at all three exposure sites. SE 555U high strength silicone (if unpigmented) suffers a severe loss in tensile strength when aged outdoors. Bent loop specimens of EPM (MD460), Hycar 4021 and Genthane SR, all chemically saturated elastomers, have cracked within two years in Panama (all three types) and Rock Island (EPM and Hycar 4021). (Author)

AD-626 929 Fld. 11/10, 20/11
CFSTI Prices: HC $1.00 MF $0.50
DAYTON UNIV OHIO RESEARCH INST
FRACTURE PROPERTIES OF CARBOXYLIC RUBBERS,
by John C. Halpin, and F. Bueche. Oct 65, 25p. Contract AF33 (657)-10688 Proj. AF-7342
Task 734202
AFML TR-65-108
Unclassified report

Descriptors: (*Synthetic rubber, Fracture (Mechanics)), (*Elastomers, Fracture (Mechanics)), (*Vulcanizates, Fracture (Mechanics)), Aging (Materials), Sulfur, Zinc compounds, Oxides, Strain, Viscoelasticity, Tensile properties, Butadienes, Nitrile rubber

Rupture properties of sulfur and zinc oxide vulcanizates of a carboxylic rubber were experimentally determined. When the logarithm of the strength at break is plotted against the logarithm of the strain at break, failure envelopes are obtained for the two vulcanizates which diverge at long times or high temperatures. As a consequence of this experimental fact it is apparent that while there exists a failure envelope which uniquely describes a given viscoelastic system there is no general shape of the failure envelope representative of all the rupture properties of an elastomer through all degrees of vulcanization. It is shown that the molecular fracture theory of Bueche and Halpin provides a quantitative basis for the analysis of the strength properties of elastomers through a wide range of vulcanizate quality, provided the specific character of the network structure is taken into account. It is suggested that the so-called 'unique' strength properties of metal oxide vulcanizates are in reality a natural reflection of a sparse network crosslinkage concentration. (Author)

AD-627 005 Fld. 11/10
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
STUDYING VULCANIZATION OF FLUOROCOPOLYMERS WITH POLYAMINES BY INFRARED SPECTROSCOPY METHOD,
by A. S. Novikov, and F. A. Galil-Oglii. 21 Dec 65, 14p. Rept. no. FTD-TT-65-1371
TT 66-60349
Unclassified report

Unedited rough draft trans. of Vysokomolekulyarnye Soedineniya (USSR) v4 n12 p1799-1804 1962.

Descriptors: (*Elastomers, Vulcanization), (*Halocarbon plastics, Vulcanization), (*Vulcanization, Amines), N-heterocyclic compounds, Copolymerization, Chemical bonds, Magnesium compounds, Oxides, Decomposition, Fluorine compounds, USSR

It was found that the vulcanization of a hexafluoropropylene-vinylidene fluoride with hexamethylenediamine (HMDA) results in the formation of a HMDAhydrofluoride salt (as a result of dehydrofluorination of the copolymer) and the formation of double bonds in the polymer chain which, in turn, join with a portion of the HMDA to form C-N and C=N bonds. In the presence of MgO the same bonds are formed, but without the formation of the HMDA-hydrofluoride. Heating the mixture of the copolymer and HMDA-HF results in the dehydrofluorination of the latter compound, making additional HMDA available for bond formation. The separated HF, however, tends to disrupt the C=N bonds. The susceptibility of these bonds may be the primary cause of the relatively low heat and acid resistance of fluoro-copolymers vulcanized with polyamines.

AD-627 124 Fld. 11/10
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
RAW AND VULCANIZED RUBBER (SELECTED ARTICLES).
21 Dec 65, 24p. Rept. no. FTD-TT-65-1229
TT 66-60378
Unclassified report

Unedited rough draft trans. of Kauchuk i Rezina (USSR) v24 n2 p10-2, 16-9 1965.

Descriptors: (*Rubber, Additives), USSR, Polyethylene plastics, Carbon black, Reinforcing materials, Vulcanizates, Xylenes, Polymers, Mechanical properties, Wear resistance

Contents: The use of polyethylene in rubber compounds, Ya. M. Bilalov, F. F. Koshelev, et al; Study of the effect of carbon-black structures on the reinforcement of rubber in model systems, N. N. Lezhnev, B. Ya. Yampol'skiy, et al.

11/11. SOLVENTS, CLEANERS AND ABRASIVES

AD-626 804 Fld. 11/11
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
SURFACE CHEMICAL DISPLACEMENT OF ORGANIC LIQUIDS FROM SOLID SURFACES.
Interim rept.,
by Marianne K. Bernett, and W. A. Zisman. 15 Dec 65, 25p. Rept. no. NRL-6354
Proj. RR 001-01-43-4751 ,SR 007-08-04 Task 0617
Unclassified report

Descriptors: (*Cleaning compounds, Effectiveness), (*Surface-active substances, Effectiveness), Solids, Surfaces, Cleaning, Organic materials, Liquids, Organic compounds, Solubility, Surface tension, Siloxanes, Alcohols, Fluorine compounds

An investigation was made of the various factors operative in the displacement by organic liquid compounds of a bulk layer of any nonaqueous liquid from a solid surface. Although the solid surfaces used in the experiments were SAE 1020 steel and borosilicate glass, the results are readily applied to any solids. The nonaqueous pure liquids displaced were selected to cover the surface tension range and included n-hexadecane, ar-dibromoethylbenzene, tris8esyl phosphate, and propylene carbonate. A large number of well-defined displacing agents were investigated, of which the most efficient proved to be those where an optimum balance could be achieved between low surface tension, high equilibrium spreading pressure, and good solubility with respect to the organic substrate to be removed. Agents which were particularly effective for long-lasting or permanent displacement were certain classes of highly fluorinated organic compounds and lowmolecular-weight dimethyl silicones. Low-surface-tension polar hydrocarbons, such as n-alkanols, were effective for temporary displacement. The several mechanisms operative in liquid-liquid displacement from solid surfaces were investigated. It was shown that these results and generalizations include our earlier results on water displacement as a special (and extreme) case. (Author)

Field 12-MATHEMATICAL SCIENCES

12/1. MATHEMATICS AND STATISTICS

AD-626 668 Fld. 12/1
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
SOME APPLICATIONS OF MONOTONE OPERATORS IN MARKOV PROCESSES,
by J. MacQueen, and R. M. Redheffer. 5 May 65, 9p. Rept. no. WMSI-29
Contract Nonr-233 (75)
Unclassified report

Availability: Published in The Annals of Mathematical Statistics v36 n5 p1421-5 Oct 1965. Copies to DDC users only.

Descriptors: (*Operators (Mathematics), Statistical processes), (*Statistical processes, Operators (Mathematics)), Errors, Integral equations, Differential equations, Potential theory

This paper establishes uniqueness, stability, and methods of error estimation for a broad class of integrodifferential equations that arise in the study of Markov processes.

AD-626 761 Fld. 12/1
CFSTI Prices: HC $4.00 MF $0.75
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF
ON VAN DER CORPUT DIFFERENTIAL SYSTEMS,
by John E. Weidlich,Jr.. Jan 66, 116p. Rept. no. LMSC-6-76-66-1
Contract Nonr-222 (37) ,NSF-G-1884 Proj. NR-041-157
Unclassified report

Descriptors: (*Nonlinear differential equations, Asymptotic series), Functional analysis, Real variables

AD-626 851 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
WISCONSIN UNIV MADISON DEPT OF STATISTICS
MISSING VALUES IN MULTIVARIATE STATISTICS. II. POINT ESTIMATION IN SIMPLE LINEAR REGRESSION.
Technical rept.,
by A. A. Afifi, and R. M. Elashoff. Jul 65, 24p. Rept. no. TR-53
Contract Nonr-1202 (17) ,PHS-43-64-562 Proj. NR-042-222
Unclassified report

Performed in cooperation with California Univ., Berkeley. See also AD-625 269.

Descriptors: (*Multivariate analysis, Probability), Least squares method, Statistical functions, Stochastic processes, Distribution theory, Analysis of variance

In this paper, the authors study the probabilistic behavior of several ways to estimate the linear regression function between two random variables. They derive the mean square error of prediction for each method of estimation. Tables are given to characterize in terms of the correlation coefficient those situations where a given method has smaller mean square error than its competitors.

AD-626 852 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
WISCONSIN UNIV MADISON DEPT OF STATISTICS
BAYESIAN ANALYSIS OF RANDOM-EFFECT MODELS IN THE ANALYSIS OF VARIANCE. II. EFFECT OF AUTOCORRELATED ERRORS.
Technical rept.,
by George C. Tiao, and W. Y. Tan. Aug 65, 37p. Rept. no. TR-54
Contract Nonr-1202 (17) Proj. NR-042-222
Unclassified report

See also AD-604 266.

Descriptors: (*Analysis of variance, Mathematical models), Errors, Stochastic processes, Statistical functions

AD-626 853 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
WISCONSIN UNIV MADISON DEPT OF STATISTICS
BAYESIAN APPROACHES TO SOME BOTHERSOME PROBLEMS IN DATA ANALYSIS.
Technical rept.,
by George E. P. Box. Oct 65, 31p. Rept. no. tr-56
Contract Nonr-1202 (17) Proj. NR-042-222
Unclassified report

Talk presented at Annual Phi Delta Kappa Symposium on Educational Research (7th), Aug 1965.

Descriptors: (*Statistical analysis, Data), Sampling, Probability, Distribution theory, Analysis of variance

AD-626 854 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
WISCONSIN UNIV MADISON DEPT OF STATISTICS
THE USE OF SECOND ORDER 'SPHERICAL' AND 'CUBOIDAL' DESIGNS IN THE WRONG REGIONS.
Technical rept.,
by Norman R. Draper, and Willard E. Lawrence. Nov 65, 10p. Rept. no. TR-57
Contract Nonr-1202 (17) Proj. NR-042-222
Unclassified report

Prepared in cooperation with Marquette Univ., Milwaukee, Wis.

Descriptors: (*Experimental design, Combinatorial analysis), Geometric forms, Statistical tests, Analysis of variance

AD-626 910 Fld. 12/1
CALIFORNIA UNIV LOS ANGELES
AN ALGEBRAIC PROOF OF THE LAGRANGE-BURMANN FORMULA,
by Peter Henrici. 1964, 7p.
Unclassified report

Sponsored by the Office of Naval Research and the U. S. Army Research Office (Durham).

Availability: Published in Journal of Mathematical Analysis and Applications v8 n2 p218-24 Apr 1964.

Descriptors: (*Matrix algebra, Functions), (*Power series, Matrix algebra), (*Functions, Power series), Complex numbers, Asymptotic series

AD-626 914 Fld. 12/1
HARVARD UNIV CAMBRIDGE MASS DEPT OF MATHEMATICS
WELL-SET CAUCHY PROBLEMS AND C (0) SEMIGROUPS,
by Garrett Birkhoff. 1964, 23p.
Unclassified report

Partly supported by ONR.

Availability: Published in Journal of Mathematical Analysis and Applications v8 n2 p303-24 Apr 1964. Copies to DDC users only.

Descriptors: (*Groups (Mathematics), Partial differential equations), (*Partial differential equations, Groups (Mathematics)), (*Functional analysis, Groups (Mathematics)), Integral transforms, Distribution theory, Matrix algebra

The purpose of this paper was to develop an idea of Hille that well-set Cauchy problems with time-independent coefficients can be effectively represented by semigroups of bounded linear transformations on Banach spaces. His idea is justified, after being reinterpreted along lines already suggested for systems of linear partial differential equations with constant coefficients.

AD-626 931 Fld. 12/1
CFSTI Prices: HC $3.00 MF $0.75
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
PROBABILITY INTEGRALS OF THE MULTIVARIATE F DISTRIBUTION, WITH TABLES AND APPLICATIONS.
Scientific rept.,
by P. R. Krishnaiah, and J. V. Armitage. Nov 65, 58p. Rept. no. arl-65-236
Proj. AF-7071
Unclassified report

Descriptors: (*Integrals, Probability), (*Statistical distributions, Integrals), Tables, Multivariate analysis

Approximate evaluation of the probability integrals of the central multivariate F distribution and exact evaluation of the probability integrals of the non-central multivariate t square distribution are considered in this paper. Also, upper 10%, 5%, 2.5% and 1% points of the central multivariate t square distribution are given for the equicorrelated case. (Author)

AD-626 945 Fld. 12/1, 3/2, 4/1
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
NUMERICAL INVERSION OF LAPLACE TRANSFORMS AND SOME INVERSE PROBLEMS IN RADIATIVE TRANSFER,
by R. E. Bellman, H. H. Kagiwada, and R. E.Kalaba. Dec 65, 25p. Rept. no. RM-4856-PR
Contract AF49 (638)-1700
Unclassified report

Descriptors: (*Integral transforms, Numerical analysis), (*Numerical analysis, Transport properties), (*Atmosphere, Transport properties), Astrophysics, Scattering

A consideration of a semi-infinite homogeneous slab atmosphere that absorbs radiation and scatters it isotropically. A basic inverse problem is the determination of the source function, given the angular dependence of the emergent radiation. The authors show how to solve this problem, making use of previous work on the numerical inversion of Laplace transforms. (Author)

AD-626 969 Fld. 12/1, 9/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ALL-UNION CONFERENCE ON COMPUTER MATHEMATICS,
by N. S. Bakhvalov, and A. N. Tikhonov. 6 Jan 66, 2p. Rept. no. FTD-TT-65-1807
TT 66-60339
Unclassified report

Unedited rough draft trans. of Uspekhi Matematicheskikh Nauk (USSR) v20 n3 p254-5 1965.

Descriptors: (*Symposia, Mathematics), (*Mathematics, Symposia), (*Programming (Computers), Mathematics), USSR

The Conference was held in Moscow from 22 to 26 January, 1965. About 2000 persons took part in the conference and more than 300 reports were heard. The work of the conference was divided into the following sections: (1) Computer methods

of algebra, quadratures and approximation of functions; (2) numerical methods for solving ordinary differential equations; (3) numerical methods for solving equations with partial derivatives; (4) numerical methods for solving integral and functional equations; (5) methods for solving optimum problems; (6) numerical methods for solving incorrectly stated problems; (7) numerical methods for solving problems of mechanics; (8) numerical methods for solving problems of physics and chemistry.

AD-626 970 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
CERTAIN INTEGRAL INEQUALITIES AND THE SOLVABILITY OF DEGENERATING QUASILINEAR ELLIPTIC SYSTEMS OF DIFFERENTIAL EQUATIONS,
by Yu. A. Dubinskii. 6 Jan 66, 31p. Rept. no. ftd-TT-65-1808
TT 66-60340

Unclassified report

Unedited rough draft trans. of Matematicheskii Sbornik (USSR) v64 n3 p458-80 1964.

Descriptors: (*Inequalities, Integrals), (*Partial differential equations, Boundary value problems), (*Boundary value problems, Partial differential equations), Integration, USSR

AD-626 976 Fld. 12/1, 9/2
CFSTI Prices: HC $2.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
PROBABILITY PROBLEM ABOUT INSTRUCTION OF AUTOMATA TO DISTINGUISH CLASSES AND THE METHOD OF POTENTIAL FUNCTIONS,
by M. A. Aizerman, E. M. Braverman, and L. I.Rozonoer. 27 Dec 65, 44p. Rept. no. FTD-MT-64-256
TT 66-60346

Unclassified report

Edited machine trans. of mono. Veroiatnostnaya Zadacha ob Obuchenii Avtomatov Raspoznavaiyu Klassov i Metod Potentsialnykh Funktsii, Moscow, 1964 p1-40.

Descriptors: (*Automata, Probabi.ity), (*Harmonic analysis, Automata), Classification, Mathematical prediction, Algorithms, Potential theory

There is given a probability formulation of the problem of instruction of automata to separate input situations into two classes. An account is given of an algorithm based on the method of potential functions which makes it possible to construct a function which approximates the degree of certainty that the situation arising at the input of the automation belongs to one class or the other. A theorem is proven concerning the convergence (in probability) of the function set up by the algorithm to this degree of certainty. (Author)

AD-627 103 Fld. 12/1
BRITISH COLUMBIA UNIV VANCOUVER - DEPT OF MATHEMATICS
ON BAYES PROCEDURES,
by Lorraine Schwartz. 16 Mar 64, 18p. Contract DA-04-200-ORD-171
AROD 362:72

Unclassified report

Availability: Published in Z. Wahrscheinlichkeitstheorie v4 p10-26 1965. Copies to DDC users only.

Descriptors: (*Decision theory, Distribution theory), Probability, Measure theory, Statistical analysis

A result of Doob regarding consistency of Bayes estimators is extended to a large class of Bayes decision procedures in which the loss functions are not necessarily convex. Rather weak conditions are given under which the Bayes procedures are consistent. One set involves restrictions on the a priori distribution and follows an example in which the choice of a priori distribution determines whether the Bayes estimators are consistent. Another example shows that the maximum likelihood estimators may be consistent when the Bayes estimators are not. However, the conditions given are of an essentially weaker nature than those established for consistency of maximum likelihood estimators. (Author)

AD-627 104 Fld. 12/1
CALIFORNIA UNIV BERKELEY
A REMARK ON THE COIN TOSSING GAME,
by David Blackwell, and David Freedman. 3 Jan 64, 4p. Contract DA-ARO (D)-31-124-G476
AROD 362:62

Unclassified report

Availability: Published in The Annals of Mathematical Statistics v35 n3 p1345-7 Sep 1964. Copies to DDC users only.

Descriptors: (*Game theory, Probability), Stochastic processes, Real numbers, Queueing theory

AD-627 109 Fld. 12/1
CALIFORNIA UNIV BERKELEY
A REMARK ON THE CENTRAL LIMIT THEOREM.
by Lucien LeCam. 5 May 65, 7p. Contract DA-ARO (D)-31-124-G548
AROD 362:67

Unclassified report

Availability: Published in Proceedings of the National Academy of Sciences v54 n2 p354-9 Aug 1965. Copies to DDC users only.

Descriptors: (*Measure theory, Probability), (*Theorems, Probability), Distribution theory, Inequalities, Distribution functions, Integral transforms, Stochastic processes

AD-627 114 Fld. 12/1
CALIFORNIA UNIV BERKELEY
THE TWO-SAMPLE SCALE PROBLEM WHEN LOCATIONS ARE UNKNOWN.
Revised ed.,
by M. Raghavachari. 24 Feb 65, 8p. Contract DA-ARO (D)-31-124-G548
AROD 362:73

Unclassified report

Revision of manuscript submitted 13 Nov 64.

Availability: Published in The Annals of Mathematical Statistics, v36 n4 p1236-42 Aug 1965. Copies to DDC users only.

Descriptors: (*Statistical tests, Scale), Sampling, Distribution functions, Stochastic processes, Monte Carlo method

AD-627 115 Fld. 12/1
CALIFORNIA UNIV BERKELEY
ON THE EFFICIENCY OF THE NORMAL SCORES TEST RELATIVE TO THE F-TEST,
by M. Raghavachari. 8 Jan 65, 3p. Contract DA-ARO (D)-31-124-G548
AROD 362:74

Unclassified report

Availability: Published in The Annals of Mathematical Statistics, v36 n4 p1306-7 Aug 1965. Copies to DDC users only.

Descriptors: (*Statistical tests, Effectiveness), Statistical distributions

AD-627 116 Fld. 12/1
CALIFORNIA UNIV BERKELEY
ASYMPTOTICALLY OPTIMAL TESTS OF COMPOSITE HYPOTHESIS FOR RANDOMIZED EXPERIMENTS WITH NONCONTROLLED PREDICTOR VARIABLES,
by Jerzy Neyman, and Elizabeth L. Scott. 1965, 24p. Contract DA-ARO (D)-31-124-G548, NSF-GP-2593
AROD 362:68

Unclassified report

Availability: Published in The Journal of the American Statistical Association, v60 p699-721 Sep 1965. Copies to DDC users only.

Descriptors: (*Statistical tests, Optimization), (*Stochastic processes, Statistical tests), Experimental design, Monte Carlo method, Artificial precipitation

The paper is concerned with randomized experiments with one treatment. Two randomization schemes are considered: randomized pairs and unrestricted randomization. If effective at all, the treatment is supposed to affect the conditional distribution of the 'experimental' variable Y given another variable X, called 'predictor'. The distribution of X is not affected by the treatment. Using the general theory published elsewhere, the paper deduces the locally asymptotically optimal test of the hypothesis that the treatment has no effect. Apart from the usual difficulties connected with asymptotic tests (how large must N be), the theory is easily applicable in many 'live' cases even though the conditional distribution of Y given X may contain nuisance parameters and be of unusual form. (Author)

AD-627 118 Fld. 12/1
CALIFORNIA UNIV BERKELEY
SUFFICIENCY AND APPROXIMATE SUFFICIENCY.
Revised ed.,
by L. Le Cam. 30 Jun 64, 38p. Contract DA-ARO (D)-31-124-G83
AROD 362:45

Unclassified report

Revision of manuscript submitted 8 Mar 61.

Availability: Published in The Annals of Mathematical Statistics, v35 n4 p1419-55 Dec 1964. Copies to DDC users only.

Descriptors: (*Distribution theory, Measure theory), Decision theory, Topology, Functions, Statistical tests

The present paper is essentially an investigation of the relations between various definitions of sufficiency and approximate sufficiency. Although some of the arguments described may be applicable to sequential experimentation, the paper is concerned only with the case where the observations are taken in one single step.

AD-627 122 Fld. 12/1
CALIFORNIA UNIV BERKELEY
THE TAIL SIGMA -FIELD OF A MARKOV CHAIN AND A THEOREM OF OREY,
by David Blackwell, and David Freedman. 14 Oct 63, 6p. Contract DA-ARO (D)-31-124-G83, NSF-GP10
AROD 362:69

Unclassified report

Availability: Published in The Annals of Mathematical Statistics, v35 n3 p1291-95 Sep 1964. Copies to DDC users only.

Descriptors: (*Probability, Theorems), (*Theorems, Probability), Measure theory, Matrix algebra, Stochastic processes, Groups (Mathematics)

AD-627 125 Fld. 12/1
CALIFORNIA UNIV BERKELEY
OPERATING CHARACTERISTIC AND EXPECTED SAMPLE SIZE OF A SEQUENTIAL

PROBABILITY RATIO TEST FOR THE SIMPLE EXPONENTIAL DISTRIBUTION,
by M. Raghavachari. 1965, 10p. Contract DA-ARO (D)-31-124-G83
AROD 362:70

Unclassified report

Availability: Published in Calcutta Statistical Association Bulletin, v14 n53/54 p65-73 Mar-Jun 1965. Copies to DDC users only.

Descriptors: (*Statistical tests, Sequential analysis), (*Statistical distributions, Statistical tests), Sampling, Probability, Stochastic processes

It is shown that for a class of sequential probability ratio tests, exact expressions for the operating characteristic and the expected sample size can be given. The nature of the expected sample size function and the effect of Wald's approximations to the stopping bounds of the sequential probability ratio test are also studied.

AD-627 129 Fld. 12/1
CALIFORNIA UNIV BERKELEY
ON THE DISTRIBUTION OF SUMS OF INDEPENDENT RANDOM VARIABLES,
by Lucien LeCam. 1965, 27p. Contract DA-ARO (D)-31-124-G83
AROD 362:71

Unclassified report

Proceedings of an International Research Seminar, Statistical Lab., California Univ., Berkeley, 1963.

Availability: Published in Bernoulli (1723) Bayes (1763) LaPlace (1813), Anniversary Volume, Heidelberg, p179-202 1965. Copies to DDC users only.

Descriptors: (*Distribution theory, Stochastic processes), (*Stochastic processes, Distribution theory), Sequences, Measure theory, Probability

AD-627 134 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y
PERIODIC SOLUTIONS OF NONLINEAR DIFFERENTIAL EQUATIONS AND SOLUTIONS OF FUNCTIONAL EQUATIONS BY TOPOLOGICAL METHODS.
Final rept., 1 Jan 62-31 Dec 65,
by Jane Cronin Scanlon. 31 Dec 65, 2p. Contract DA-31-124-ARO (D)-56 ,DA-ARO (D)-31-124-G70 Proj. DA-59901004
AROD 2428:9

Unclassified report

Descriptors: (*Nonlinear differential equations, Topology), (*Topology, Nonlinear differential equations), (*Equations, Topology), Stability, Transformations (Mathematics)

The problem studied is that of the existence of periodic solutions of a system (in vector notation) (E) $x = f(x,t)$ where f has period T in variable t, i.e., a nonautonomous system with 'large' nonlinearities. Previously known results on this problem are largely restricted to the 2dimensional case except for a few results for the 3dimensional case. Results and conclusions reached: A new technique for establishing the existence of periodic solutions of (E) was developed for the 2-dimensional case. The technique consists in studying the behavior of solutions of (E) near the point at infinity by studying the stability of the origin as a critical point of the system obtained by performing an inversion transformation on (E). Practical sufficient conditions for stability and asymptotic stability (i.e., conditions which can be verified by straight-forward computation) were derived. The technique developed for the 2-dimensional case was extended to the n-dimensional case and new existence theorems for periodic solutions were derived. (Document quoted in its entirety)

AD-627 187 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH MATHEMATICS RESEARCH LAB
MONOTONICITY OF RATIOS OF MEANS AND OTHER APPLICATIONS OF MAJORIZATION,
by Albert W. Marshall, Ingram Olkin, and Frank Proschan. Dec 65, 24p. Rept. no. D1-82-0490,Mathematical note-436

Unclassified report

Descriptors: (*Statistical analysis, Theory), Distribution functions, Matrix algebra, Number theory

Monotonicity of a ratio can be viewed as a form of total positivity. The theory of total positivity is exploited to obtain more general results. The proof of monotonicity is based on a theorem giving sufficient conditions for majorization. Several other applications of the majorization theorem are given. One application concerns a stochastic comparison between a function of order statistics from a distribution with increasing failure rate average and the same function of the order statistics from the exponential distribution. Another application is to a comparison between the condition number of a positive definite matrix and the condition number of a polynomial in the matrix.

AD-626 676 **See Fld. 20/14**

AD-626 836 **See Fld. 13/13**

AD-626 856 **See Fld. 21/2**

AD-626 920 **See Fld. 9/4**

AD-627 022 **See Fld. 9/2**

AD-627 074 **See Fld. 9/1**

AD-627 078 **See Fld. 20/1**

AD-627 126 **See Fld. 20/4**

AD-627 150 **See Fld. 19/4**

12/2. OPERATIONS RESEARCH

AD-626 650 Fld. 12/2
CFSTI Prices: HC $6.00 MF $1.25
RAND CORP SANTA MONICA CALIF
GEOMETRIC ASPECTS OF OPTIMAL CONTROL THEORY WITH DISCONTINUITIES,
by Russell D. Shaver. Jan 66, 240p. Rept. no. P-3289

Unclassified report

Descriptors: (*Optimization, Control), (*Control, Theory), (*Geometry, Control), Calculus of variations, Equations of motion, Functions, Sounding rockets

AD-626 669 Fld. 12/2
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
BETTING SYSTEMS WHICH MINIMIZE THE PROBABILITY OF RUIN,
by Thomas S. Ferguson. 13 Oct 64, 28p. Rept. no. WMSI Reprint-30
Contract NSF-GP-1606

Unclassified report

Availability: Published in J. Soc. Indust. Appl. Math. v13 n3 p795-818 Sept 1965. Copies to DDC users only.

Descriptors: (*Game theory, Probability), (*Probability, Game theory), Statistical processes, Optimization, Uncertainty

The paper is concerned with survival in favorable games. The basic models for favorable games are presented. Related work of other authors is reviewed where the main objective is to maximize the expected utility of the fortune at the end of a fixed number of games. Exhibited is a large class of utility functions which lead to betting systems in which bets are proportional to the resources, and a contrasting model is investigated which leads to betting systems which are independent of the resources. This model requires the freedom to borrow unlimited amounts without interest. A model is analyzed in which the only possible bets are $1 and $2, and where the problem is to minimize the probability of ruin. The special case when the win probabilities are choses independently from a uniform distribution is solved completely, and the betting system which minimizes the probability of ruin is explicitly exhibited. The results of this case and several other considerations allow arrival at a reasonable conjecture as to the asymptotic (for large fortunes) form of the optimal betting system for two very general models. These results are presented and generalized by discoutning the probabilities of future survival.

AD-626 728 Fld. 12/2, 5/3
CFSTI Prices: HC $1.00 MF $0.50
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
A GEOMETRIC DUALITY THEOREM WITH ECONOMIC APPLICATION.
Research rept.,
by David Gale. Dec 65, 18p. Rept. no. orc-65-32
Contract Nonr-222 (83) Proj. NR-047-033 ,RR-003-07-01

Unclassified report

Descriptors: (*Linear programming, Economics), (*Economics, Linear programming), Geometry, Production, Theorems, Operations research

Let S be a surface in a normed linear space which is the graph of a concave function. At each point x of S there is a supporting linear function and the Duality Theorem states that there is one such function of smallest norm and this norm is equal to the 'steepness' of the surface at x. The result is used to give economically meaningful, necessary and sufficient conditions for the validity of the Kuhn-Tucker Theorem and also to provide an estimate of the Kuhn-Tucker prices relating them to the marginal productivity of capital. (Author)

AD-626 982 Fld. 12/2
CFSTI Prices: HC $1.00 MF $0.50
CARNEGIE INST OF TECH PITTSBURGH PA GRADUATE SCHOOL OF INDUSTRIAL ADMINISTRATION
STRUCTURAL SENSITIVITY ANALYSIS IN LINEAR PROGRAMMING AND AN EXACT PRODUCT FROM LEFT INVERSE.
Management sciences research rept.,
by W. W. Cooper, and A. Charnes. 15 Dec 65, 11p. Rept. no. MSRR-62
Contract Nonr-760 (24) Proj. NR-047-048

Unclassified report

Prepared in cooperation with Northwestern Univ., Evanston, Ill.. Contract Nonr-1228 (10), Proj. NR-047-021, Systems Research Memo-141.

Descriptors: (*Linear programming, Matrix algebra), (*Matrix algebra, Linear programming), Networks, Transportation, Model theory, Optimization

This paper shows how to obtain an exact inverse in the form of a product modification to a given inverse when the matrix has been altered additively by a matrix of a certain class. Explicit formulae are derived for sensitivity analyses, e.g., in linear programming, wherein the elements of the structural matrix are to be varied. (Author)

AD-627 088 Fld. 12/2
CFSTI Prices: HC $2.00 MF $0.50
CALIFORNIA ANALYSIS CENTER INC SANTA MONICA
SIMOPTIMIZATION RESEARCH PHASE I.

Annual rept. 1 May 64-1 May 65,
by Herbert W. Karr, Ernel L. Luther, Harry M.Markowitz, and Edward C. Russell. 1 Nov 65, 49p. Rept. no. CACI-65-P2.0-1
Contract Nonr-4562 (00) Proj. NR-276-012,RR-003-11-01

Unclassified report

Descriptors: (*Optimization, Simulation), (*Mathematical models, Operations research), Scheduling, Statistical tests, Mathematical programming, Costs, Management planning

The objective of the SimOptimization research is to develop efficient, economical techniques for locating improved (but not necessarily optimum) solutions to simulation models where analytical optimization techniques cannot be realistically applied. The three techniques developed are: the decentralized gradient approach (DGA) which is based on dividing the system into decentralized units and, assuming certain independence, simultaneously adjusts all free parameters; the linear response surface (LRS) approach which consists of a sequential variation of each parameter in the vicinity of the final DGA solution; and the quadratic response surface (QRS) approach which makes a quadratic approximation to the cost surface and then locates the optimum solution on that fitted surface. The techniques are designed to be applied sequentially--each being more sensitive to parameter interactions than its predecessor, but also more expensive in terms of computing time. The DGA and LRS techniques were tested using a simple task resource model. The QRS approach remains to be tested. The three techniques, the model, and the test procedures used are described in detail. The report presents complete test results, along with an analysis of the convergence and efficiency of the DGA and LRS techniques based on the empirical data generated. Both DGA and LRS gave very good results in the tests conducted. (Author)

AD-627 099 Fld. 12/2, 17/7, 9/2
CFSTI Prices: HC $5.00 MF $1.00
SYLVANIA ELECTRONIC SYSTEMS-EAST NEEDHAM MASS
DIGITAL COMPUTATION STUDY, DYNAMIC VS KINEMATIC EQUATIONS.
Final technical rept.,
by Fred Levine. 3 Dec 65, 173p. Contract N61339-1407 Proj. 7623B
NTDC 1407-1

Unclassified report

Descriptors: (*Mathematical models, Equations of motion), (*Equations of motion, Maneuverability), Simulation, Dynamics, Mechanics, Control, Ships, Aircraft, Submarines, Programming (Computers)

At present, the simulation of a vehicle's motion is accomplished by use of either dynamic or kinematic equations. This report presents a method of simulating vehicular motion which is a compromise between these two methods. The equations developed, although very close to kinematic equations in form, contain terms which represent the dynamics of the motions being simulated. Expressions are developed to simulate the motion of submarine, surface vessel, and aircraft. Those for the aircraft describe its motion as a rigid body in space responding to the maneuvering orders; those for the submarine and surface vessel duplicate the accuracy and flexibility now attainable with simple dynamic differential equations. This latter is accomplished by using considerably less computer time and with less restriction on the size of the iteration interval. (Author)

AD-627 145 Fld. 12/2
CFSTI Prices: HC $6.00 MF $1.25
SYSTEMS RESEARCH CENTER CASE INST OF TECH CLEVELAND OHIO
A FORMAL APPROACH TO CONCEPTS OF INTERACTION.
Doctoral thesis,
by Louis G. Birta. Oct 65, 238p. Rept. no. SRC-81-A-65-31
Contract Nonr-1141 (12)

Unclassified report

Descriptors: (*Systems engineering, Mathematical models), (*Mathematical logic, Systems engineering), Functional analysis, Set theory, Topology, Operations research

A formal study of interaction in systems is reported. The study is undertaken in the framework of a mathematical structure which serves as a model for a broad class of real systems from diverse scientific disciplines. The viewpoint is taken that the word interaction should not be associated with a single unique phenomenon in systems, but rather, should be considered as a label for a family of distinct but related phenomena. In the framework of the general system model certain mathematical concepts are formulated which correspond to phenomena in this family. The properties of these concepts are investigated and several interrelations among them are established. Several of the concepts considered are interpreted in the context of particular real systems. It is shown that certain of the concepts coincide with well-established notions generally regarded as unique to these particular real systems. (Author)

AD-627 172 Fld. 12/2
PURDUE UNIV LAFAYETTE IND
DISCRETE OPTIMIZING.
Revised ed.,
by Stanley Reiter, and Gordon Sherman. 7 Oct 64, 30p.

Unclassified report

Revision of manuscript submitted 10 Dec 63. Prepared in cooperation with Tennessee Univ., Knoxville., Contract NAS8-11189.

Availability: Published in J. Soc. Indust. Appl. Math. v13 n3 p864-89 Sep 1965. Copies to DDC users only.

Descriptors: (*Optimization, Linear programming), Operations research, Scheduling, Probability, Algorithms, Monte Carlo method, Decision theory, Permutations, Dynamic programming

AD-627 193 Fld. 12/2
MATHEMATICA PRINCETON N J
INTEGER PROGRAMMING. METHODS, USES, COMPUTATION,
by M. L. Balinski. May 65, 62p. Contract DA-31-124-ARO (D)-31 ,Nonr-4004 (00)
AROD 4087:3

Unclassified report

Availability: Published in Management Science v12 n3 p253-313 Nov 1965. Copies to DDC users only.

Descriptors: (*Linear programming, Algorithms), Numbers, Combinatorial analysis, Operations research

This paper attempts to present the major methods, successful or interesting uses, and computational experience relating to integer or discrete programming problems. Included are descriptions of general algorithms for solving linear programs in integers, as well as some special purpose algorithms for use on highly structured problems. This reflects a belief, on the author's part, that various clever methods of enumeration and other specialized approaches are the most efficacious means existent by which to obtain solutions to practical problems. A serious try at gathering computational experience has been made-but facts are difficult to uncover. The paper was written with intent to enable readers to read selected sections without having to read the whole. (Author)

AD-627 203 Fld. 12/2
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
DYNAMIC PROGRAMMING AND LINEAR PREDICTION THEORY,
by Richard Bellman. 16 May 61, 10p. Rept. no. P-2308

Unclassified report

Descriptors: (*Dynamic programming, Mathematical prediction), (*Mathematical prediction, Dynamic programming), Optimization, Stochastic processes

The application is considered of the theory of dynamic programming to a discrete form of the linear prediction problem, that of minimizing over u sub k a given quadratic form.

Field 13-MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13/2. CIVIL ENGINEERING

AD-626 654 **See Fld. 8/13**

AD-626 713 **See Fld. 8/6**

AD-626 922 **See Fld. 13/3**

AD-626 943 **See Fld. 8/13**

AD-626 980 **See Fld. 11/7**

AD-627 036 **See Fld. 6/11**

AD-627 043 **See Fld. 8/13**

AD-627 045 **See Fld. 1/5**

AD-627 138 **See Fld. 13/13**

13/3. CONSTRUCTION EQUIPMENT, MATERIALS AND SUPPLIES

AD-626 922 Fld. 13/3, 11/2, 13/2
CFSTI Prices: HC $1.00 MF $0.50
OHIO RIVER DIV LABS MARIEMONT RIGID PAVEMENT LAB
STUDY OF UNIFORMITY OF CONCRETE FLEXURAL STRENGTH TEST RESULTS.
Oct 54, 16p.

Unclassified report

Descriptors: (*Concrete, Flexural strength), Tests, Reliability, Roads

The following tentative conclusions are based on the tests conducted, which were comparatively limited in scope: Considerable variation in flexural strength test results may be expected for specimens taken from the same concrete mix, even under the best controlled conditions of preparing, curing and testing of the specimens. A variation in flexural strength of 10 percent from the average value is not considered to be a satisfactory criterion for rejection of individual test results. A variation in flexural strength of 15 percent from the average value may be considered significant when the difference cannot be attributed to variations in the concrete mix. The rejection of individual values under any of the criteria considered has only a minor effect on the average strength of a group of specimens, and the effect becomes less as the number of specimens in the group increases. (Author)

AD-626 788 **See Fld. 11/9**

AD-626 798 **See Fld. 13/13**

AD-626 944 **See Fld. 1/5**

13/5. COUPLINGS, FASTENERS, AND JOINTS

AD-626 988 Fld. 13/5, 11/6, 20/11
CFSTI Prices: HC $3.00 MF $0.75
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
FATIGUE AND STATIC PROPERTIES OF WELDED JOINTS IN LOW ALLOY STRUCTURAL STEELS,
by G. E. Nordmark, J. E. Stallmeyer, and W. H. Munse. Jan 55, 68p. Contract DA-33-017-eng-255
Unclassified report

See also AD-626 989.

Descriptors: (*Welds, Steel), (*Steel, Welds), Fatigue (Mechanics), Structural properties, Statics, Metal plates

An investigation was made to determine the fatigue and static properties of butt-welded joints in A-242 steel and to compare, quantitatively, these results with those obtained from similar joints in A-7 steel. Four types of specimens were employed in this investigation. A plain plate specimen was selected to determine the fatigue properties of the base material, a tee filletwelded joint was used to compare the fatigue properties of fillet welds deposited with E7016 electrodes on A-242 and A-7 steels, and longitudinal and transverse buttwelded joints were selected to study the fatigue and static properties of butt welds with the applied load parallel to and perpendicular to the direction of welding. All of the fatigue specimens were tested on a zero-tension stress cycle of such a magnitude that failure generally occurred between 100,000 and 2,000,000 cycles. To study the effect of surface geometry, the plain plate and butt weld specimens were tested either with the mill scale and weld reinforcement on or with all surface irregularities removed by grinding. The A-242 longitudinal butt-welded joints were found to be about 15 percent stronger under repeated loads then similar A-7 joints, whereas there was little difference between the average fatigue strengths of transverse butt-welded joints of the two steels. (Author)

AD-626 989 Fld. 13/5, 11/6, 20/11
CFSTI Prices: HC $3.00 MF $0.75
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
FATIGUE AND STATIC PROPERTIES OF WELDED JOINTS IN LOW ALLOY STRUCTURAL STEELS, II,
by G. E. Nordmark, Z. Shoukry, and J. E. Stallmeyer. Jan 56, 78p. Contract DA-33-017-eng-255
Unclassified report

See also AD-626 988.

Descriptors: (*Steel, Welds), (*Welds, Steel), Fatigue (Mechanics), Structural properties, Statics, Metal plates, Fracture (Mechanics), Stresses

An investigation was made to determine the fatigue and static properties of butt-welded joints in A-242 steel and to compare, quantitatively, these results with those obtained from similar joints in A-7 steel. Tests were performed on three low alloy steels having appreciably different chemical compositions to determine the uniformity of the results. The report includes the results of tests of four types of specimens: plain plate specimens, longitudinal fillet-welded joints, and transverse and longitudinal butt-welded joints. All of the fatigue specimens were tested on a zerotension stress cycle of such a magnitude that failure generally occurred between 100,000 and 2,000,000 cycles. When subjected to repeated loadings the low alloy joints (welded with low hydrogen electrodes) were found to be about 15 per cent stronger than similar joints of A-7 steel prepared with E6010 electrodes. However, when compared to joints in A-7 steel prepared with E7016 electrodes, the advantage of the A-242 joints was less than 10 per cent for the butt-welded joints. The second phase of the investigation was carried out to determine whether brittle fracture would occur in a simple welded joint as a result of the stress concentrations inherent in a welded connection. The results of the few tests which have been conducted indicate that there is a considerable reduction in energy absorbing capacity (reduction of area and elongation), but little difference, however, in the strength or in the fracture appearance. (Author)

AD-626 994 Fld. 13/5, 13/8, 11/6
CFSTI Prices: HC $4.00 MF $1.00
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
WELDING TESTS ON STRUCTURAL AND RAIL (CW1.018). FERROUS ARC WELDING. EFFECTS OF HYDROGEN AND RELATED VARIABLES ON THE PHYSICAL PROPERTIES OF WELDS ON STRUCTURAL STEELS.
Sep 52, 146p. Contract DA-33-017-eng-96
Unclassified report

Descriptors: (*Arc welds, Hydrogen embrittlement), (*Hydrogen embrittlement, Steel), (*Steel, Hydrogen embrittlement), Arc welding, Physical properties, Metallography, Bending, Strain (Mechanics), Fracture (Mechanics)

Bend test specimens, prepared from bead-on-plate welds, were tested as simple beams on a 4-1/2 in. span with the weld beads in tension. The investigation included a study of variables affecting hydrogen embrittlement, of the effect of these variables in different regions of the weld, of possible methods of relieving the detrimental effects, and of a possible relationship between hydrogen embrittlement and restraint during welding.

AD-627 061 Fld. 13/5, 11/6, 13/8
CFSTI Prices: HC $3.00 MF $0.75
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
FATIGUE AND STATIC TESTS OF FILLET WELDS,
by L. A. Harris, and G. E. Nordmark. 1 Aug 54, 83p. Contract DA-33-017-eng-221
Unclassified report

Descriptors: (*Welds, Fatigue (Mechanics)), Welding rods, Stresses, Tests, Statics, Failure (Mechanics), Metal plates, Hydrogen, Steel, Cellulose

A large amount of scatter was encountered in the tee fillet weld tests; however, the average fatigue strength of the specimens prepared with the E7016 electrode was about 10 per cent greater than that of the specimens prepared with the E6010 electrode. All of the E7016 joints had fatigue strengths which were significantly greater than the exceptionally low fatigue strengths of some of the E6010 joints. The exceptionally low fatigue strengths of some of the specimens prepared with the E6010 electrode appeared to be caused by an abnormally large amount of porosity in the weld metal. The E7016 welds were relatively free from porosity. The tee fillet joints produced with the low hydrogen electrodes conforming to the Military Specification Mil-E-986A (Mil 180) had an average fatigue strength which was about 10 per cent greater than the average fatigue strength of the E7016 joints and about 25 per cent greater than that of the E6010 joints. Preheating to 300 deg. F. had little effect on the E6010 joints, but increased the average fatigue strength of the E7016 joints about 10 per cent so that they performed about as well as the Mil 180 specimens. Removal of the paper spacers prior to testing decreased the average fatigue strength about 15 per cent. The ultimate strengths of the statically tested tee fillet specimens varied from 58,000 psi to 63,200 psi on the throat of the weld. (Author)

AD-627 231 See Fld. 13/8

13/6. GROUND TRANSPORTATION EQUIPMENT

AD-626 993 See Fld. 8/13

13/7. HYDRAULIC AND PNEUMATIC EQUIPMENT

AD-626 652 Fld. 13/7, 13/9
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
THE INVOLUTE CAM ROTARY ACTUATOR FOR HYDRAULIC SERVOMECHANISMS,
by L. H. Schwerdtfeger. Jul 58, 37p. Rept. no. TG-310
Contract NOrd-7386
Unclassified report

Descriptors: (*Hydraulic servomechanisms, Actuators), (*Actuators, Cams), Rotation, Design, Performance (Engineering), Reliability, Torque

The article shows that a rotary hydraulic actuator, by virtue of a symmetrical involute cam rocker arm, will offer the following attractions to designers: no backlash and high stiffness; no rotary high pressure fluid seals, no high starting or running friction; zero pressure angle; angular motion directly proportional to linear motion; constant torque throughout full range of motion; simplicity, economy and reliability. Through examples illustrating several basic types, the fundamental design procedure is presented, together with instructions for calculating all pertinent dimensions. Material selection (that oft-neglected subject) is discussed, and a few 'timely hints' of practical consideration is offered. (Author)

AD-626 981 Fld. 13/7
CFSTI Prices: HC $2.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN FREEPORT N Y
PERFORMANCE ANALYSIS OF A SUPERSONIC MECHANICAL ACCELERATOR,
by Robert J. Cresci, and C. Waldman. Oct 65, 40p. Rept. no. PIBAL-820
Contract AF33 (657)-8286 Proj. AF-7065 Task 706501
ARL 65-213
Unclassified report

Descriptors: (*Axial-flow compressors, Performance (Engineering)), Axial-flow compressor blades, Supersonic flow, Impellers, Heat transfer, Thermodynamics, High-pressure research, Analysis

The performance of a three stage axial flow compressor was computed to evaluate the compressor exit flow properties for various rotor tip speeds and inlet conditions. The compressor operates with supersonic relative velocities in all stages, and has blading with large turning angles. The analysis includes the effects of local heat transfer to the wetted surfaces. The analysis is performed using the results obtained from two dimensional cascade experiments for pressure recovery and local heat rates. The compressor is of the impulse type, therefore, relatively large increases in total pressure and total temperature are achieved in each stage. Real gas effects are included in the analysis by utilizing curve fits to the Mollier diagram for air in chemical and the thermodynamic equilibrium; this is necessary for the pressure and temperature levels achieved in the compressor. (Author)

AD-627 230 See Fld. 11/1

13/8. INDUSTRIAL PROCESSES

AD-626 663 Fld. 13/8
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
MINIMIZING CONTAMINATION FOR VACUUM,
by Fred Rosebury. 1965, 5p. Contract DA-36-039-AMC-03200 (E)
Unclassified report

Availability: Published in Research/Development Magazine, F. D. Thompson Publications, Inc. Jan 1966. Copies to DDC users only.

Descriptors: (*Vacuum apparatus, Contamination), Decontamination, Clean rooms, Cleaning, Vacuum, Electron bombardment, Induction heating

Techniques that avoid the pitfalls of contamination in cleanly handling vacuum devices -- from electron tubes to walk-in chambers -- result in uniformly better operation and in pinpointing trouble spots. (Author)

AD-626 879 Fld. 13/8
NOTRE DAME UNIV IND DEPT OF METALLURGICAL ENGINEERING AND MATERIALS SCIENCE
ACCELERATED STRESS RELAXATION CAUSED BY AN ALTERNATING MAGNETIC FIELD.
Technical rept.,
by B. D. Cullity, and C. W. Allen. 28 Jan 65, 3p.
Rept. no. TR-1
Contract Nonr-1623 (10) Proj. NR-031-679
Unclassified report

Availability: Published in Acta Metallurgica v13 n8 p933-5 1965. Copies to DDC users only.

Descriptors: (*Stress relieving, Magnetic fields), Nickel, Alternating current, Stresses, Relaxation time

The rate of stress relaxation, at constant strain, in nickel at room temperature can be increased by the application of a magnetic field alternating at 60 c/s. This effect was observed in tension, but found to be much more pronounced in bending.

AD-626 992 Fld. 13/8, 9/1, 14/4
CFSTI Prices: HC $1.00 MF $0.50
SPRAGUE ELECTRIC CO NORTH ADAMS MASS
STUDY, INVESTIGATION, AND DEVELOPMENT OF NON-DESTRUCTIVE RELIABILITY SCREENING OF METALLIZED MYLAR CAPACITORS.
by E. Rondeau. Dec 65, 25p. Contract AF30 (602)-3632 Proj. AF-5519 Task 551902
RADC TR-65-447
Unclassified report

Descriptors: (*Capacitors, Non-destructive testing), (*Non-destructive testing, Capacitors), (*Reliability (Electronics), Non-destructive testing), Polyester plastics, Life expectancy, Test methods

The scope of work being performed is reviewed, and the self-healing mechanism unique to metallized Mylar capacitors is described. The principal failure modes of these capacitors are listed. The procedures used to determine the proper measurement conditions for nondestructive screening are presented. The techniques used to analyze the results of these investigations are outlined. The measurement conditions which showed the largest dispersions of results are: for insulation resistance - 300 VDC at 65C; for dissipation factor 30 VAC, 100 cps, at 85C. An additional experiment selected conditions of 250 VAC, 60 cps, at 25C for the test. The details of this experiment are described. The program for the clearing test is detailed, and the life test conditions for the cleared units are given. One portion of the clearing test remains to be accomplished. The program for the burn-in test is outlined, and the test matrix is presented. The results of life testing the burned-in units are being analyzed. (Author)

AD-627 017 Fld. 13/8, 22/2
CFSTI Prices: HC $2.00 MF $0.50
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA
PROCESS DEVELOPMENT OF SHAPED MAGNESIUM-LITHIUM CASTINGS.
Technical research rept.,
by Anthony Saia, and Ralph E. Edelman. Nov 65, 29p.
FA R-1785
Unclassified report

Descriptors: (*Magnesium alloys, Casting), (*Casting, Magnesium alloys), Lithium alloys, Silicon alloys, Castings, Molding, Molding materials, Graphite, Radiography, Mechanical properties, Aerospace craft, Minerals, Bonding

A process was developed for successfully casting a number of prototype aerospace components using the ternary magnesium-lithium-silicon alloy. These components contained many of the design elements anticipated in aerospace hardware of this type. It was found that conventional magnesium sand foundry practice was not satisfactory. A new molding material, based upon bentonite-bonded graphite powder, was employed. Melting and pouring practice was also modified to cope with the reactive nature of the alloy. The radiographic quality of the castings and mechanical properties of test bars sectioned from the castings were evaluated and found to be satisfactory and to correspond with earlier experience on separately cast test bars. (Author)

AD-627 101 Fld. 13/8, 11/6
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF
CHEMICAL MILLING OF BERYLLIUM,
by L. Missel, and M. E. Shaheen. 1965, 4p.
Unclassified report

Availability: Published in Metal Finishing Nov 1965. Copies to DDC users only.

Descriptors: (*Beryllium, Chemical milling), (*Chemical milling, Beryllium), Etching, Solutions, Sulfuric acid, Ammonium compounds, Fluorides, Nitric acid, Hydrogen compounds, Acids, Surface properties

The etching rate of the ammonium bifluoride baths is easier to control than that of the sulfuric acid baths. Even though the overall surface provided by sulfuric acid etching is smoother than the surface provided by ammonium bifluoride etching, the better control with ammonium bifluoride and the lesser tendency to create deep pits are more important than overall surface smoothness. Considerable data on part positioning, agiation, racking, etc., based on commercial chemical milling practice with other metals, is in existence and is applicable to beryllium. Specific details are best worked out in practice. Blasting with water suspended abrasive is recommended after chemical milling before any further processing. It is essential that a good ventilation system be provided because of fume toxicity. (Author)

AD-627 121 Fld. 13/8
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
HEAT TREATMENT OF HIGH STRENGTH STEELS WITH THE USE OF ELECTRICAL HEATING,
by Yu. G. Andreev, E. K. Zakharov, I. N. Kidin, V. I. Lizunov, and O. V. Maksimova. 4 Jan 66, 12p. Rept. no. FTD-TT-65-1472
TT 66-60376
Unclassified report

Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Chernaya Metallurgiya (USSR) v8 n3 p157-60 1965.

Descriptors: (*Heat treatment, Steel), (*Steel, Heat treatment), USSR, Heating, Hardening, Induction heating, Mechanical properties, Tempering

AD-627 231 Fld. 13/8, 13/5
CFSTI Prices: HC $1.00 MF $0.50
AUTOMATION INDUSTRIES INC BOULDER COLO RESEARCH DIV
ADVANCEMENT OF ULTRASONIC TECHNIQUES USING RERADIATED SOUND ENERGIES FOR NONDESTRUCTIVE EVALUATION OF WELDMENTS.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 65, by B. T. Cross, G. L. Cross, and G. J. Posakony. 15 Jan 66, 22p. Rept. no. TR-66-3
Contract NObs-92530 Proj. SR007-10-04 Task 891
Unclassified report

See also AD-624 262.

Descriptors: (*Ultrasonic radiation, Non-destructive testing), (*Non-destructive testing, Ultrasonic radiation), (*Welds, Non-destructive testing), Ultrasonic properties, Energy conversion, Graphics

The long range objective of the work being performed under this contract is to find a better technique for ultrasonic nondestructive evaluation of weldments. The immediate objective is to provide a clearer understanding of the ultrasonic weld inspection technique known as the 'Delta Configuration'. This technique has been employed for several years, but the approach has been entirely empirical. Before further advances could be made, analytical verification of the physics of the sound energy had to be established. Once the path and pattern of the sound energy can be predicted, instrumentation and fixturing can be developed which will amplify the merits of this technique. A test block, designed to study the phenomena, was used to obtain field intensity maps of the sound energy. The tests provided an unexpected result in that a second energy conversion was identified. The existence of this second mode conversion was verified. Knowledge obtained is important because it increases the potential of using the Delta Configuration for both thick and thin weldments. (Author)

AD-627 255 Fld. 13/8, 11/6, 13/10, 11/3
CFSTI Prices: HC $7.00 MF $1.75
DEPARTMENT OF THE NAVY WASHINGTON D C
PROTECTING OFF-SHORE OIL INDUSTRY INSTALLATIONS AGAINST CORROSION,
by V. F. Negreev, A. G. Khanlarova, and R. G. Gadzhieva. 1965, 361p. Rept. no. Translation-2076
TT 66-60402
Unclassified report

Zashchita ot Korrozii Morskikh Neftepromyslovykh Sooruzhenii, Trans. of mono. Nedra, Moscow, 1964 n. p.

Descriptors: (*Corrosion inhibition, Marine engineering), (*Marine engineering, Petroleum industry), USSR, Structures, Steel, Sea water, Welds, Corrosion, Bituminous coatings, Paints, Varnishes, Rubber coatings, Metal coatings, Calhodic protection, Protective treatments

Contents: Corrosion of steel when wholly immersed in sea water, corrosion of welded seams under sea conditions, the effect of the design of the installations on corrosion, Protection of steel structures against corrosion in the off-shore petroleum industry, protective bitumen coatings, protecting off-shore oil industry installations against corrosion, paint and varnish finishes for the protection of off-shore installations, rubber coverings for protection of supports used in off-shore works, protective metal coatings, electrochemical protection in sea water.

AD-626 661 **See Fld. 9/1**

AD-626 754 See Fld. 20/12

AD-626 760 See Fld. 14/2

AD-626 849 See Fld. 9/1

AD-626 994 See Fld. 13/5

AD-627 006 See Fld. 11/3

AD-627 061 See Fld. 13/5

AD-627 137 See Fld. 9/1

AD-627 247 See Fld. 14/2

AD-627 249 See Fld. 13/10

AD-627 251 See Fld. 13/10

13/9. MACHINERY AND TOOLS

AD-627 092 Fld. 13/9
CFSTI Prices: HC $3.00 MF $0.75
FELTMAN RESEARCH LABS PICATINNY ARSENAL DOVER N J
STATIC LOAD DISTRIBUTION AND DYNAMIC OVERLOADING IN CYLINDRICAL GEARS OF THE SPUR AND HELICAL TYPES.
Technical translation,
by Adam Morecki. Jan 66, 74p.
PA TT-1,

Trans. of Archiwum Budowy Maszyn (Poland) v8 n2 p139-92 1961.

Descriptors: (*Gears, Loading (Mechanics)), Load distribution, Stresses, Dynamics, Statics, Poland, Force (Mechanics), Test equipment

A method is presented for the study of the static load distribution between mating teeth, and for the study of the dynamic loading in cylindrical gear pairs with straight or helical teeth having an involute profile. Described are: the design of a test-stand based on the principle of revolving power, and the method of measurements by means of tensometric sensing devices. The results of measurements are shown for gears with different numbers of teeth and different moduli, also for gear pairs in various positions, all as related to the precision of gear cutting, their peripheral speed and the condition of loading. Analytical relationships are derived, which provide a basis for calculating the normal stress and the magnitude of the dynamic overload in such gears during engagement. (Author)

AD-626 652 See Fld. 13/7

13/10. MARINE ENGINEERING

AD-626 703 Fld. 13/10, 20/4
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
HYDRODYNAMIC RESISTANCE OF SHIPS ON AN AIR CUSHION,
by V. V. Klichko. 1965, 13p. Rept. no. Translation-2036
TT 66-60367

Unclassified report

Trans. of Sudostroenie (USSR) v31 n5 p12-8 1965.

Descriptors: (*Ships, Ground effect), (*Ground-effect machines, Ships), Hydrodynamic configurations, Fluid dynamic properties, Drag, Water waves, Ship hulls, Friction, Sprays, USSR

The role of the individual components of the hydrodynamic resistance can be determined by the type of surface-effect ship (SVP) and by the regime under which it is moving (the load, initial trim angle, trunk height, and speed of movement). For relative speeds Fr < 1, and elongations L/B < 2.0 to 2.5, and independent of the type of SVP, prevailing are wave resistance and resistance of the interaction which makes its appearance during direct contact of the bow extremity of the hull and the elements of the air cushion enclosure with the water during the transitional phase. When parts of the hull, such as the skegs, for example, are submerged, and for considerable elongations (L/B > 2.5) and low relative speeds Fr < 1, the basic component is the friction resistance. Friction resistance and spray resistance predominate at relative speeds Fr > 1.5. For the SVP of the nozzle type in which the side and bottom lines are well streamlined the resistance decreases with increase in speed. Unsatisfactory streamlining in the design, ribs in the bottom, and, in many cases, flexible enclosures, increase the resistance. For the chamber type SVP, increase in resistance with increased speed is characteristic in all cases reviewed. (Author)

AD-626 717 Fld. 13/10, 13/13
CFSTI Prices: HC $4.00 MF $1.00
DEPARTMENT OF THE ARMY WASHINGTON D C
EFFECTIVE UTILIZATION OF BERTHING INSTALLATIONS DURING RECONSTRUCTION,
by G. M. Gidal. 1965, 139p. Rept. no. In-124-65
TT 66-60280

Unclassified report

Trans. of mono. Effektivnoe Ispolzovanie Prichalnykh Sooruzhenii Pri Rekonstruktsii, Moscow 1964 pA11.

Descriptors: (*Piers, Construction), Loading (Mechanics), Civil engineering, Marine engineering, Foundations (Structures), Materials, USSR

The brochure uses the concrete examples of the reconstructiбn of existing hydraulic engineering structures in Liyepaja and Klajpeda ports to show the potentialities of creating piers answering modern requirements by means of maximum utilization of their carrying capacity. A separate chapter is devoted to organization of work in experimental loading of existing construction and calculation of its carrying capacity. The brochure is of interest for a broad circle of engineering-technical workers connected with the exploitation and planning of hydraulic engineering installations. Students specializing in hydraulic engineering in merchant marine higher institutes of learning will read it with interest. (Author)

AD-627 023 Fld. 13/10
CFSTI Prices: HC $3.00 MF $0.75
DAVID TAYLOR MODEL BASIN WASHINGTON D C
RECENT DEVELOPMENTS IN PRESSURE HULL STRUCTURES AND MATERIALS FOR HYDROSPACE VEHICLES.
Summary rept.,
by John G. Pulos, and Martin A. Krenzke. Dec 65, 69p. Rept. no. DTMB-2137
Proj. S-F013-0302 ,SPO-5-0003 Task 1961

Unclassified report

Descriptors: (*Submarine hulls, Deep submergence), Submarines, Structural shells, Cylindrical bodies, Spheres, Stiffened cylinders, Rings, Materials, Composite materials, Steel, 'Aluminum alloys, Titanium alloys, Glass textiles, Plastics, Ceramic fibers, Marine engineering

A number of research organizations have been playing a key role in developing the structures and materials technologies required for designing and fabricating the pressure hulls, a controlling factor, of these deep-submergence vehicles. This paper summarizes some significant theoretical and experimental findings, and their application, which have resulted from research and development efforts during the past several years. Specifically, recent developments in shell-like structures, e.g., cylindrical, spherical, and spheroidal, and the impact of new hull materials on structural concepts and design are discussed. (Author)

AD-627 035 Fld. 13/10
CFSTI Prices: HC $2.00 MF $0.50
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
A NOTE ON THE PROBLEM OF AN OSCILLATING SUPERCAVITATED HYDROFOIL NEAR A FREE SURFACE.
Final rept. Apr 64-Oct 65,
by John M. Grace, and Irving C. Statler. Oct 65, 48p. Rept. no. CAL-BB-1935-S-1
Contract NObs-90278 Proj. SS-600-000 Task 1719

Unclassified report

Descriptors: (*Hydrofoils, Fluid dynamic properties), Moments, Lift, Cavitation, Two-dimensional flow, Mathematical analysis

The objective of the study was to determine the steady and unsteady forces and moments on a fully caviated hydrofoil operating near a free surface. The approach assumed linearized, two-dimensional, potential flow but no further limitations were placed on the values of Froude number, cavitation number, or depth-to-chord ratio. Full account was taken of the gravity waves on both the air-water and cavity interfaces generated by the motion of the foil-cavity system. The report discusses the approach to the general problem based on a representation of the system by distributions of elemental singularities. The solution for the steady motion of a deeply submerged, supercavitated, flat-plate foil is obtained in this manner. (Author)

AD-627 080 Fld. 13/10
CFSTI Prices: HC $1.00 MF $0.50
NAVAL APPLIED SCIENCE LAB BROOKLYN N Y MATERIAL SCIENCES DIV
A SURVEY OF THE LITERATURE ON SHIPBOARD ICE FORMATION.
Technical memo.,
by N. Fein, and A. Freiberger. 23 Jun 65, 17p.
Proj. SF-013-99-02 Task 0519
NASL 9300-20-TM-2

Unclassified report

Descriptors: (*Ice, Ships), (*Ships, Ice), Hazards, Wind, Stability, Nucleation, Crystal growth, Meteorological parameters, Reviews

The survey of ice-formation literature indicates that there are relatively few papers specifically concerned with shipboard icing. However, numerous articles (not reviewed herein) have been written about aircraft icing and sea ice.

AD-627 249 Fld. 13/10, 11/9, 13/8
CFSTI Prices: HC $4.00 MF $0.75
DEPARTMENT OF THE NAVY WASHINGTON D C
PLASTIC SHIP HULLS,
by V. V. Kushelev, and I. A. Sokolov. 1960, 104p. Rept. no. Translation-1094
TT 66-60393

Unclassified report

Trans. of mono. Korpusa Sudov Iz Plastmass (USSR) Leningrad 1960.

Descriptors: (*Ship hulls, Plastics), (*Plastics, Ship hulls), Manufacturing methods, Composite materials, Reinforcing materials, Laminated plastics, Glass textiles, Tensile properties, Joining, Expanded plastics, Finishes + finishing, Safety, Ship structural components, Ship accessory equipment, Tools, USSR

The book describes the use of reinforced plastics for building ships' hulls and cites data on the materials used on hull structures, and the technology involved in building the hull. The book is for engineers and shipbuilding technicians working in the field of planning and building plastic ships. (Author)

AD-627 250 Fld. 13/10, 1/3
CFSTI Prices: HC $2.00 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C HYDROMECHANICS LAB
SEAWORTHINESS CHARACTERISTICS OF A GROUND EFFECT MACHINE OBTAINED FROM MODEL TESTS OVER REGULAR WAVES.
Final rept.,
by Alvin Gersten, and Joseph M. Sheehan. Dec 65, 34p. Proj. BUSHIPS-S-F013 02 08 Task 10275
DTMB 2034

Unclassified report

Descriptors: (*Ground effect machines, Model tests), (*Water waves, Ground effect machines), Motion, Drag, Acceleration, Pitch (Motion), Ships

A model representing a ground effect machine (GEM) designed by the Bureau of Ships for overwater operation was towed over regular waves allowing freedom in pitch and heave. The tests were conducted with the craft traveling in following seas. Measurements were made of the resulting motions, drag forces, and accelerations. The data reveal that at speeds up to 40 knots, the pitching motion per unit wave height of the GEM is generally more severe than that experienced by conventional small craft and large oceangoing ships. The heaving motion per unit wave height of the GEM is also greater than the characteristic heaving motion of more conventional vessels. It was also determined that pitch and heave motions and surge force are linearly related to wave height throughout the range utilized in these tests. Wave steepnesses as great as 1/32 were investigated. (Author)

AD-627 251 Fld. 13/10, 13/8
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
PERFECTING THE TECHNOLOGY OF SHIPBUILDING.
1965, 8p. Rept. no. Translation-1077
TT 66-60394

Unclassified report

Trans. of Sudostroenie (USSR) v31 n1 p1-4 1965.

Descriptors: (*Ships, Construction), Management engineering, State-of-the-art reviews, Manufacturing methods, Materials, USSR

AD-626 858 **See Fld. 10/2**

AD-627 247 **See Fld. 14/2**

AD-627 255 **See Fld. 13/8**

AD-627 259 **See Fld. 9/1**

13/11. PUMPS, FILTERS, PIPES, TUBING AND VALVES

AD-626 831 Fld. 13/11, 15/3
CFSTI Prices: HC $2.00 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
BLAST RESISTANCE OF CHECK AND GATE VALVES.
Technical note,
by K. R. Bockman, J. C. King, and R. S. Chapler.
Nov 65, 32p. Rept. no. TN-N-756
Proj. NCEL-Y-F011-05-02-347

Unclassified report

Descriptors: (*Valves, Shock waves), (*Check valves, Blast), (*Gate valves, Blast), Fallout shelters, Civil defense systems, Loading (Mechanics), Tests, Test methods

The objective of this task was to determine the blast resistance of standard check and gate valves which may be used in protective shelter equipment and utility systems. To accomplish this objective, commercially available 3 inch 200 psi WOG (water, oil, or gas) bronze check and gate valves were subjected to transient air pressures to about 390 psi (the maximum capability of the Laboratory at the time of the tests) and to transient hydraulic pressures to about 2000 psi. Subsequent visual examination, operational tests, and hydrostatic leak tests revealed no damage to the valves, and test data indicated relatively low magnitudes of strain, which leads to the conclusion that standard check and gate valves can withstand transient loads far in excess of their rated capacity. In order to determine whether or not the valves may be dynamically loaded when subjected to a nuclear blast wave, the natural frequencies of the valves were obtained and compared to the rise time of nuclear explosions. This showed that if a blast wave reaches the valve without attenuation, dynamic loading could occur. If, however, the wave must propagate through a piping system to reach the valve, the wave front may be relatively unchanged, or it may steepen and possibly increase the dynamic loading, or it may be attenuated so that little or no dynamic loading would occur. In the case of shocks generated by the test equipment, it was shown that dynamic loading was not applied. Because the most severe loading conditions could not be produced by the test equipment, the exact configuration in which valves are to be used must be considered before recommendations can be made as to their blast resistance.

13/12. SAFETY ENGINEERING

AD-627 054 Fld. 13/12, 7/2
CFSTI Prices: HC $1.00 MF $0.50
BUREAU OF MINES PITTSBURGH PA
HYDROGEN SAFETY.
Progress rept. no. 7, 1 Jul-30 Sep 65,
by R. A. Van Meter, A. Strasser, E. L. Litchfield and J. Grumer. Oct 65, 17p.

Unclassified report

See also N64-26035.

Descriptors: (*Hydrogen, Safety), (*Safety, Hydrogen), Disposal, Combustion, Monitors, Performance (Engineering), Handling, Jets

Two hydrogen detectors were evaluated for performance; studies were continued of hydrogen plumes and the combustion characteristics of heterogeneous mixtures of hydrogen and air.

13/13. STRUCTURAL ENGINEERING

AD-626 770 Fld. 13/13, 18/3, 15/3
CFSTI Prices: HC $6.00 MF $1.25
TULANE UNIV NEW ORLEANS LA DEPT OF CIVIL ENGINEERING
AN INVESTIGATION OF SCHOOL DESIGNS TO RESIST INTEGRATED NUCLEAR WEAPONS EFFECTS.
Final technical rept.,
by Robert N. Bruce Jr., James E. Branch, Marius P. Gronbeck, John T. Hanley, and Dennis F. McCahill. 1965, 214p. Rept. no. TR-100
Contract OCD-PS-64-215

Unclassified report

Descriptors: (*Fallout shelters, Design), (*Blast, Fallout shelters), (*Thermal radiation, Fallout shelters), (*Radioactive fallout, Fallout shelters), Nuclear weapons, Nuclear explosion damage, Structures, Costs, Pressure, Construction, Site selection, Fire safety, Ventilation, Civil defense systems

The report consists of a comprehensive study of the capabilities of the awardwinning entries of the National School Fallout Shelter Design Competition, TR-19, to provide protection against effects of nuclear weapons other than those which are associated with fallout. Specific areas of investigation included: (1) An examination and evaluation of the winning designs to ascertain their bonus protection and inherent resistance to withstand thermal radiation, overpressure, and dynamic pressure; (2) A tabulation of advantages and disadvantages of each design, as applicable; (3) Recommendations for appropriate design modifications; and (4) A tabulation of costs for the recommended modifications. (Author)

AD-626 798 Fld. 13/13, 13/3
CFSTI Prices: HC $2.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
CONSTRUCTION NORMS AND REGULATIONS.
Dec 65, 29p. Rept. no. FSTC-381-T65-695
TT 66-60292

Unclassified report

Trans. of Konstruktsionnye Normy i Ustavy (USSR) v3 n4 p3-16 1965.

Descriptors: (*Construction, Standards), USSR, Buildings, Housing, Structures, Asbestos, Structural parts, Polymers, Ducts, Adhesives, Walls, Coatings, Floor coverings, Moistureproofing, Weatherproofing, Thermal insulation, Plastics, Glass textiles, Roofs, Concrete, Cements

Contents: structures of asbestocement components: structures of asbestocement components for apartment houses, structures of asbestocement components for industrial buildings, asbestocement air ducts; structures and items based on polymers, glueing of walls, solid coverings, slab covering, sheet material coverings, linoleum surfaces; insulation work, foundation insulation, floor insulation, wall insulation with roll materials, roofing materials on a concrete base, preparing plastic concretes and plastic mortars, preparing sizing mastic and primer.

AD-626 836 Fld. 13/13, 20/11, 12/1
CFSTI Prices: HC $3.00 MF $0.75
TECHNISCHE HOCHSCHULE STUTTGART (GERMANY)
MATRIX DISPLACEMENT ANALYSIS OF PLATES AND SHELLS. PROLEGOMENA TO A GENERAL THEORY. PART I,
by J. H. Argyris. Oct 65, 69p. Contract AF61 (052)-854

Unclassified report

Descriptors: (*Matrix algebra, Structural shells), (*Structural shells, Matrix algebra), (*Sheets, Matrix algebra), Mathematical models, Deformation, Deflection, West Germany

AD-626 881 Fld. 13/13, 20/11
FRITZ ENGINEERING LAB LEHIGH UNIV BETHLEHEM PA
EXPERIMENTS ON HIGH STRENGTH STEEL MEMBERS. THE EXPERIMENTAL BEHAVIOR OF RESTRAINED COLUMNS,
by Peter F. Adams, Maxwell G. Lay, and Theodore V. Galambos. Nov 65, 44p. Rept. no. Fritz Reprint-287
Contract NObs-94092 .NBy-53160

Unclassified report

Also available as Fritz-297.8, AD-606 138; Fritz-278.10, AD-603 107.

Availability: Welding Research Council, 345 E. 47th St., New York, N. Y., HC $2.00.

Descriptors: (*Steel, Beams (Structural)), (*Beams (Structural), Structural properties), Tests, Loading (Mechanics), Stresses, Strain hardening, Structural parts, Buckling (Mechanics)

The report describes tests performed on members of ASTM A441 steel as part of a project which has as its aim the extension of plastic design procedures to include steels of up to 50 ksi yield strength. The testing program consisted of basic

material property tests, beam tests under uniform moment and moment gradient, and beam-column tests. In the tests on beams and beam-columns, emphasis was placed on determining the influence of lateral-torsional and local buckling on the member behavior. The report contains the description of seven restrained column tests. Restraint of the columns was provided by beams framing rigidly into the column ends. The experiments were performed to provide experimental verification of restrained column theories proposed for use in the plastic design of steel multi-story frames. The tests showed excellent correlation with the theoretically predicted behavior. (Author)

AD-626 995 Fld. 13/13, 11/2
CFSTI Prices: HC $4.00 MF $1.00
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
DEVELOPMENT OF DESIGN CRITERIA FOR REINFORCED CONCRETE BOX CULVERTS. PART II: RECOMMENDATIONS FOR DESIGN.
Structural research series on Civil Engineering Studies; Final rept.,
by R. Diaz de Cossio, and C. P. Siess. Feb 59, 103p. Rept. no. SRS-164
Contract DA-33-017-CIVENG-57-27
Unclassified report

Descriptors: (*Reinforced concrete, Structures), (*Structures, Reinforced concrete), Design, Drainage, Loading (Mechanics), Shear stresses, Stresses, Moments

The bases for the calculation of moments and shears in culverts, and in similar structures having members with portions that can be considered infinitely stiff, are given. Expressions are also given for the moments at midspan and column face sections of rectangular one-celled reinforced concrete box culverts. The basic strength characteristics in shear and flexure, the limitations of the expressions presented, and the recommended factors of safety are discussed. The applications of the above criteria to the specific design of one-celled reinforced concrete box culverts, with recommendations for allowable bond stresses and for placing and spacing of reinforcement are given. Finally, design aids are presented in three appendixes. Appendix A contains charts for midspan and column face moments in one-celled rectangular reinforced concrete box culverts having a wide range of dimensions, for two ratios of lateral to vertical load, 1/3 and 1/2; Appendix B contains interaction diagrams for yield and ultimate capacities in flexure; and Appendix C contains charts for cracking load capacities of members. (Author)

AD-627 032 Fld. 13/13, 14/2, 8/13
CFSTI Prices: HC $3.00 MF $0.75
OHIO RIVER DIV LABS CINCINNATI
TESTING OF STEEL SHEET PILE CELLS. INSTRUMENTATION FEASIBILITY STUDY,
by C. A. Anderson. Jul 63, 98p.
Unclassified report

Descriptors: (*Foundations (Structures), Test equipment), (*Test equipment, Foundations (Structures)), Feasibility studies, Instrumentation, Soil mechanics, Measurement, Test methods, Steel, Sheets, Pressure gages, Meters, Strain gages, Performance (Engineering), Tests

Devices to measure strains in flat web steel sheet piling, total pressures in soil, hydrostatic pressures in soil, and tilt of a steel piling circular cell, were installed and tested in a full scale active cofferdam cell during its construction to investigate feasibility of placement and continued operation of such instrumentation prior to a design study. The strain and tilt devices performed satisfactorily, but the electrical pressure devices failed. The pressure devices were modified and tested in the laboratory and performed satisfactorily under simulated field conditions. Strains measured in the field project unexpectedly showed severe magnitudes of strains in the webs of the steel sheet piling. Computations of such stresses and laboratory model tests confirmed these field findings. Recommendations are made to perform full-scale tests of a circular steel piling cell for design analysis purposes, using a specially constructed steel sheet piling circular cell and the tested instrumentation. This cell is recommended to be built inside an existing concrete-walled enclosure wherein control of structure loading and other advantages may be utilized. (Author)

AD-627 082 Fld. 13/13, 20/11
CFSTI Prices: HC $3.00 MF $0.72
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
CRITICAL PRESSURES FOR RADIALLY SUPPORTED CYLINDERS.
Technical note,
by C. V. Chelapati. Jan 66, 75p. Rept. no. TN-N-773
Contract NBy-32280 Proj. Y-F008-08-02-108a
Unclassified report

Descriptors: (*Structural shells, Cylindrical bodies), (*Cylindrical bodies, Pressure), Strain (Mechanics), Force (Mechanics), Elasticity, Soil mechanics, Loading (Mechanics), Deflection

A study is made to find the critical pressures for radially supported cylinders with simple ends and subjected to uniform radial pressure. The large deflection theory developed by Langhaar and Boresi is used to find (1) the critical pressures, considering only infinitesimal deflections (Euler load), and (2) the critical pressures for snap-through buckling (energy load or Tsein's critical pressure). Two types of radial supports are utilized in this study. The first type, designated by 'elastic foundation,' is used when the support exhibits linear spring characteristics in both tension and compression. The second type, designated by 'soil foundation,' is used when the support exhibits linear spring characteristics only in compression and offers no resistance while in tension, thus representing the behavior of soil more closely. It is found that the critical pressure coefficient is a function of the length-to-radius ratio, radius-to-thickness ratio, and the coefficient of foundation. It is shown that energy loads occur for relatively short, thin, and lightly supported cylinders. In other cases energy loads and Euler loads are found to be quite close. Cylinders supported by soil foundations have lower critical pressures than cylinders supported by elastic foundations and are also susceptible to snap-through over a wider range of parameters. The number of waves in the buckled cylinder is in general smaller for energy loads than for Euler loads. Graphs are given showing energy and Euler loads over a wide range of parameters. A few tabulated results also are given for representative cases. Analytical results are compared with Bulson's experimental data on buried cylinders. (Author)

AD-627 138 Fld. 13/13, 8/13, 13/2
CFSTI Prices: HC $3.00 MF $0.75
PURDUE UNIV LAFAYETTE IND SCHOOL OF CIVIL ENGINEERING
EXPERIMENTAL STUDY OF STATIC AND DYNAMIC FRICTION BETWEEN SOIL AND TYPICAL CONSTRUCTION MATERIALS.
Rept. for 1 Apr 62-1 Apr 65,
by G. A. Leonards. Dec 65, 76p. Contract AF29 (601)-5204 Proj. AF-5710
AFWL 65-161
Unclassified report

Descriptors: (*Soil mechanics, Friction), (*Friction, Soil mechanics), (*Civil engineering, Soil mechanics), Foundations (Structures), Sand, Cements, Steel, Halocarbon, plastics, Graphite, Surface properties, Loading (Mechanics), Dynamics, Statics

A report is made of research carried out to determine, on the basis of laboratory measurements, the coefficient of friction between two sands of different gradation (one with angular and the other with rounded particles) in contact with Portland cement mortar, steel, teflon, and graphite. In the static tests, loads were applied at a uniform rate until slip occurred in approximately 5 minutes. Dynamic loads were applied by means of a shock tube, which produced a step-like forcing function; slip usually occurred in approximately 2 milliseconds or less. It was found that the coefficients of friction depend on the relative size, shape and surface roughness of the sand grains with respect to that of the surface in question; when the sliding surface is 'rough' in comparison with the sand particles, the coefficient of friction approaches the coefficient of internal friction of the sand. Both graphite and teflon serve as friction reducers, compared to the plain surfaces, irrespective of the rate at which slip is initiated. For plain steel or cement mortar, the dynamic coefficient of friction was greater than the static coefficient of friction by about 25 percent, unless the static coefficient was such that sand/sand slip was approached. The angle of shearing resistance of the sand thus provides an upper limit to the coefficient of wall friction at all rates of loading. (Author)

AD-627 177 Fld. 13/13, 11/2
CFSTI Prices: HC $4.00 MF $1.00
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
DEVELOPMENT OF DESIGN CRITERIA FOR REINFORCED CONCRETE BOX CULVERTS. PART I: STRENGTH AND BEHAVIOR OF REINFORCED CONCRETE BEAMS AND FRAMES.
Structural research series on Civil Engineering Studies; Final rept.,
by R. Diaz de Cossio, and C. P. Siess. Sep 58, 149p. Rept. no. SRS-163
Contract DA-33-017-CIVENG-57-27
Unclassified report

Descriptors: (*Reinforced concrete, Structures), (*Structural parts, Reinforced concrete), (*Structures, Drainage), Steel, Beams (Structural), Reinforcing materials, Loading (Mechanics), Bending, Tests, Shear stresses, Deformation, Fracture (Mechanics), Design

The results of 57 tests on simply-supported beams and 24 tests on frame members are described and correlated in this report. The main object of these tests was to study the behavior and strength in shear of reinforced concrete members; a few tests were intended to study the flexural strength of under-reinforced members under axial load and bending. The ultimate objective of the test program was to obtain information which would permit the development of more rational design criteria for reinforced concrete box culverts. Fundamental knowledge was first acquired through tests of simplysupported beams under various conditions of loading. And, finally, tests were made on 24 frames under conditions simulating closely those in the horizontal member of a box culvert section; three of these frames had web reinfrocement in the form of bent bars. The following major variables were studied during the course of the investigation: type of loading, concrete strength, steel percentage, ratio of span length to effective depth, ratio of shear span to effective depth, and ratio of axial to vertical load. The simply-supported beams were tested under one or two concentrated loads, or under uniform load.

AD-626 717 See Fld. 13/10

Field 14-METHODS AND EQUIPMENT

14/2. LABORATORIES, TEST FACILITIES, AND TEST EQUIPMENT

AD-626 760 Fld. 14/2, 13/8
CFSTI Prices: HC $1.00 MF $0.50
API INSTRUMENTS CO CHESTERLAND OHIO

PRODUCTION ENGINEERING MEASURE FOR METERS, TAUT-BAND SUSPENSION, A-C MOVING IRON VANE PER SIGNAL CORPS REQUIREMENTS SCS-160.
Quarterly progress rept. no. 10, 1 Aug-31 Oct 65, by R. H. Nichols. 31 Oct 65, 8p. Contract DA-36-039-AMC-01473 (E)

Unclassified report

See also AD-623 311.

Descriptors: (*Measuring devices (Electrical + electronic), Manufacturing methods), Suspension devices, Iron, Foils, Reliability, Voltmeter, Ammeters

The success of the preproduction tests completed thus far bear out the premise on which this project was based: that suspending the moving part of an iron vane meter on fine metal ribbons (taut-band suspension) could produce an instrument which not only offers the advantages of commercially available taut-band meters (no friction, excellent repeatability, low temperature influence and low power loss), but also could result in an instrument which would withstand the vibration and shock tests better than conventional pivoted jewel-bearing instruments. (Author)

AD-626 772 Fld. 14/2
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF RADIO AND ELECTRICAL ENGINEERING
TOTAL PRESSURE MEASUREMENTS BELOW 10 TO THE -10TH POWER TORR WITH NON-MAGNETIC IONIZATION GAUGES,
by P. A. Redhead, and J. P. Hobson. 14 May 65, 13p. Rept. no. NRC-8649

Unclassified report

Availability: Published in British Journal of Applied Physics v16 p1555-66 1965. Copies to DDC users only.

Descriptors: (*Ionization gages, Pressure gages), (*Low-pressure research, Ionization gages), Pressure, Measurement, Suppressors, Photoelectric effect, X-rays, Chemisorption

The modulation method has been applied to (i) the Bayard-Alpert gauge and (ii) the suppressor gauge to reduce their lower pressure limits and measurements made with these two gauges to pressures as low as 10 to the -14th power torr. It is shown that the modulated Bayard-Alpert gauge can measure pressure to 3 X 10 to the -11th power torr (10% error) without correction for the residual-current modulation effect, and measurements can be extended to 3 X 10 to the -13th power torr if corrections for the residual-current modulation are made. The residual limit of the suppressor gauge has been measured (approximately 2 X 10 to the -13th power torr). With modulation applied to the suppressor gauge the lowest measurable pressure, set by amplifier noise, is about 10 to the -13th power torr for a 10 : 1 signal-to-noise ratio. Electronic desorption of chemisorbed material from the grid of a gauge and/or a molecular flux in the gauge are shown to cause a limitation to the lowest measurable pressure; these limits may be higher than the x-ray limit under certain conditions. (Author)

AD-626 818 Fld. 14/2
CFSTI Prices: HC $2.00 MF $0.50
TRANSDUCER INFORMATION CENTER BATTELLE MEMORIAL INST COLUMBUS OHIO
QUARTERLY ACCESSION LIST 11.
Rept. for 16 Oct 65-15 Jan 66.
15 Jan 66, 34p. Rept. no. TIC-Acc-List-11
Contract AF33 (615)-2532 Proj. AF-8222 Task 822203

Unclassified report

Descriptors: (*Transducers, Instrumentation), Abstracts, Measurement, Pressure, Motion, Humidity, Calorimetry, Temperature sentive elements, Gyroscopes, Flow, Density, Attitude indicators, Radiation measurement systems, Strain (Mechanics)

Contents: Acceleration, Attitude, Bio-medical, Density, Flow, Gyro, Heat flux, Humidity, Level, Motion, Position, Pressure, Radiation, Strain, Temperature, Velocity, Vibration, General.

AD-626 828 Fld. 14/2, 18/4, 4/1
FALKINER NUCLEAR DEPT UNIV OF SYDNEY (AUSTRALIA)
RESPONSE OF PLASTIC SCINTILLATORS TO COSMIC RAY AIR SHOWERS,
by A. D. Bray, D. F. Crawford, D. L. Jauncey, C. B. A. McCusker, and D. Melley. 1 Feb 65, 6p. Contract AF-AFOSR-305-63 Proj. AF-9751 Task 975104
AFOSR 65-1954

Unclassified report

Availability: Published in The Review of Scientific Instruments v36 n5 p587-91 May 1965. Copies to DDC users only.

Descriptors: (*Cosmic ray bursts, Charged particles), (*Scintillation counters, Plastics), Measurement, Geiger counters, Cloud chambers, Pulse height analyzers, Muons, Nuclear reactions, Australia

The response of plastic scintillators to the flux of particles occurring in cosmic ray air showers was measured at various distances from the center of showers of various sizes. The number of scintillator particles S obtained by dividing the observed pulse height by the mode of the pulse-height distribution due to single fast muons was compared with the number of incident ionizing particles G seen by Wilson cloud chambers and Geiger counters. The ratio S/G is always greater than unity. It increases with increasing number of charged particles/sq meter, being 1.1 for 100 scintillator particles/sq meter and 4.0 for 10,000 scintillator particles/sq meter. It varies with radial distance from the shower center and with shower size, being 1.2 on average at 30 m from the center of showers of about 100,000 particles and greater than 4 near the center of large showers. The increase in S/G is partly due to cascading of the electromagnetic component within the plastic scintillator but mostly to nuclear interactions produced in the scintillator by strongly interacting particles. (Author)

AD-626 850 Fld. 14/2
CFSTI Prices: HC $1.00 MF $0.50
DAYTON UNIV OHIO RESEARCH INST
A KINEMATIC DILATOMETER.
Interim progress rept.,
by Roger H. Keith. Oct 65, 11p. Rept. no. UDRI-TR-65-107
Contract AF33 (615)-1312

Unclassified report

Descriptors: (*Dilatometers, Design), High-temperature research, Alignment, Heat shields

An inexpensive dilatometer with kinematically-suspended carriages id described. The instrument design features a large carriage baselength for stability and capability of measuring horizontal lengths of specimens as short as 4.5 inches. The design is adapted to high temperature workroom use by radiation shields which minimize the effects of thermal distortion. Dust shields and a design incorporating slanting carriage ways minimize grit buildup. The instrument may be easily constructed by a relatively unskilled machinist, as no close tolerances need be held to insure smooth, accurate operation. A procedure for aligning the dilatometer without the use of other instruments is also given. (Author)

AD-626 926 Fld. 14/2
CFSTI Prices: HC $2.00 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD
VARIABLE RELUCTANCE TRANSDUCER FOR USE IN WIND TUNNEL PITCH DAMPING MEASUREMENTS,
by Frank J. Regan, Richard W. Ogan, and John E. Holmes. 26 Oct 65, 36p. Rept. no. NOLTR-65-9 ,AerodynamicsResearch-242
Task RMMO-42-009/212-1/F008-09-01

Unclassified report

Descriptors: (*Transducers, Wind tunnels), (*Wind tunnels, Pitch (Motion)), Damping, Design, Electromagnetic properties, Photographic techniques, Measurement, Angle of attack, Oscillation, Wind tunnel models

This report describes the theory of operation and the electrical and mechanical design of a variable reluctance transducer for measuring the angular amplitude of a wind tunnel pitch damping model. Data acquired with this device are compared with those obtained using conventional photographic techniques. (Author)

AD-626 940 Fld. 14/2, 20/4
CFSTI Prices: HC $3.00 MF $0.75
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
RESEARCH ON ADVANCED GASDYNAMIC FACILITIES.
Summary rept.,
by J. Gordon Hall, J. A. Lordi, B. H. Fetz, F. Stoddardand , and J. Bartz. Oct 65, 70p. Contract AF33 (657)-8860 Proj. AF-7065
ARL 65-204

Unclassified report

Descriptors: (*Gas flow, Test facilities), (*Test facilities, Performance (Engineering)), (*Shock tubes, Performance (Engineering)), Nozzle throats, Enthalpy, Nonequilibrium flow

The report describes studies on methods of increasing the performance of conventional shock tubes and tunnels, and on problems peculiar to high enthalpy test facilities. A number of the studies carried out have previously been described in detail in separate reports or papers and are only summarized herein; those previously unreported are described in detail. (Author)

AD-626 954 Fld. 14/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
EFFECT OF RECEIVING SURFACE DIMENSIONS ON THE BASIC CHARACTERISTICS OF METALLIC VACUUM BOLOMETERS,
by L. M. Artyukhovska, L. S. Kremenchugskii, A. F. Malnev, and O. V. Roitsina. 6 Jan 66, 13p. Rept. no. FTD-TT-65-922
TT 66-60312

Unclassified report

Edited trans. of Ukrayinskyi Fizychnyi Zhurnal (USSR) v9 n11 p1240-7 1964.

Descriptors: (*Bolometers, Sensitivity), (*Sensitivity, Bolometers), (*Inertia, Bolometers), Theory, Spectra (Infrared), Infrared radiation, Thermal conductivity, Heat transfer, Vacuum, Metals, USSR

The sensitivity and inertia of metallic vacuum bolometers were studied as functions of receivingsurface area. Basic relationships were derived for calculations. The theoretical calculations give results in good agreement with experimental data. It is shown that the sensitivity threshold is proportional to the square root of the receiving-surface area only when the bolometer is cooled by radiation. When it is cooled by radiation and the thermal conduction of the film, the sensitivity is more strongly dependent on the width of the receiving element than on the length, while the converse applies for the inertia factor. (Author)

AD-626 983 Fld. 14/2, 20/4
CFSTI Prices: HC $2.00 MF $0.50
NEW YORK UNIV N Y
A HIGH MACH NUMBER HIGH REYNOLDS NUMBER HYPERSONIC FACILITY.
Final rept.,
by Antonio Ferri, Victor Zakkay, and Lawrence Carr. Oct 65, 34p. Contract AF33 (615)-2008 Proj. AF-7065
ARL 65-218

Unclassified report

Descriptors: (*Hypersonic wind tunnels, Design), Heat transfer, Heaters, Reynolds number, Operation, Performance (Engineering), Stagnation point, Pressure, Tests

A high Mach number (M = 14) high Reynolds number (20,000,000/ft.) facility was designed and built. This facility is capable of operating under a stagnation pressure of 30,000 p.s.i. and a stagnation temperature of 2500R. A four second running time will be available with the present design; however, the possibility of obtaining higher running time may be accomplished by increasing the air storage system. The possibility of increasing the storage air temperature is also presently being investigated. (Author)

AD-627 016 Fld. 14/2
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
DEVICE FOR SUPPLYING LIQUID AND MAINTAINING LEVEL IN APPARATUS,
by B. A. Marakhov. Dec 65, 5p. Rept. no.
FSTC-381-T65-687
TT 66-60356

Unclassified report

Trans. of Patent (USSR) 147 337, pub. 1962.

Descriptors: (*Laboratory equipment, Distillation), Hydraulic seals, Patents, USSR, Liquids, Liquid level gages

The device for supplying liquid and maintaining the level in the apparatus by using a hydroseal is distinguished by the fact that it is made in the form of an airtight supply tank for the purpose of simplifying the level maintenance system; it is connected with the evaporator by a barometric tube which is passed through a flange with a nozzle connecting the end of the barometric tube with the atmosphere. (Author)

AD-627 094 Fld. 14/2, 20/3, 9/3, 9/4, +
CFSTI Prices: HC $4.00 MF $0.75
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
PROGRESS REPORT FOR SEPTEMBER, OCTOBER, AND NOVEMBER, 1965.
Rept. for 1 Sep-31 Nov 65.
21 Jan 66, 118p. Contract DA-28-043-AMC-00073 (E) ,NSG-376

Unclassified report

See also AD-623 404.

Descriptors: (*Scientific research, Reports), Laboratories, Physics, Ionosphere, Surfaces, Secondary emission, Computers, Control systems, Teaching machines, Vacuum apparatus, Plasma physics, Superconductivity, Films, Information theory, Switching circuits, Networks, Communication systems

Contents: Space sciences group; surface physics, computer, control systems, PLATO, vacuum instrumentation, plasma physics, superconductivity studies, thin films, Information Science, switching systems, networks and communication nets.

AD-627 157 Fld. 14/2
PRINCETON UNIV N J
MAGNETIC SUSPENSION WITH MINIMUM COUPLING EFFECTS FOR WIND TUNNEL MODELS,
by T. A. Dukes, and R. N. Zapata. 15 Jun 64, 10p. Contract Nonr-1858 (37)

Unclassified report

Availability: Published in IEEE Transactions on Aerospace and Electronic Systems, vAES-1 n1 p20-8 Aug 1965. Copies to DDC users only.

Descriptors: (*Wind tunnel models, Suspension devices), (*Suspension devices, Magnetic fields), Couplings, Attenuation, Calibration, Force (Mechanics), Spheres

In a multidegree-of-freedom suspension system coupling effects are undesirable because they make the calibration difficult and they can cause deterioration of the dynamic stability of the system. The paper presents an analysis of the coupling problem leading to the design of a particular system configuration. First, the support of spherical models by means of a three-degree-of-freedom magnetic suspension system is analyzed in terms of the forces acting on a magnetized point. It is shown that coupling effects due to displacements are eliminated only if the magnetization, the resultant force to be balanced and the axis of the field providing the balancing force, are aligned with each other. In the case of axisymmetrical models this condition can always be met, except for small disturbances, in a vertical wind tunnel leading through the coil which balances the resultant of the drag and the weight. The same coil provides the magnetization of the model. Orthogonality of the force axis system is achieved by using a pair of coils, operating in push-pull, for each of the force axes perpendicular to the axis of the wind tunnel. This arrangement eliminates first-order coupling effects between the force axes. It is shown that long axi-symmetrical bodies can also be supported by the same system. This is made possible be decoupling the angular and the translational degrees of freedom. Restoring moments are produced by the field of the magnetizing coil. If the model is made of nonmagnetic material with two spheres of soft magnetic material inside, coupling moments are produced only by the difference of the magnetic forces acting on the spheres. (Author)

AD-627 168 Fld. 14/2
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MECHANICAL ENGINEERING
SHOCK TUBE INDUCTION FLOWMETER,
by Paul A. Croce. 17 Sep 64, 4p. Contract AF19 (628)-221 ,Nonr-3623 (00)

Unclassified report

Availability: Published in The Review of Scientific Instruments v36 n11 p1561-4 Nov 1965. Copies to DDC users only.

Descriptors: (*Flowmeters, Shock tubes), (*Gas flow, Velocity), Hydrogen, Argon, Hypersonic flow, Magnetic fields

Shock tube gas velocities were monitored accurately by means of a transverse-field induction flowmeter. Experiments were performed in a hydrogen-driven shock tube using argon as the test gas; shock Mach numbers were varied from 6 to 12, initial pressures from 0.5 mm Hg to 50 mm Hg, and magnetic field strengths from 0 to 1100 G. The flowmeter was calibrated by comparing measured induced voltages to theoretical values of induced voltage based on measured shock velocities. Three electrode configurations were tried and yielded similar results. Satisfactory results (less than 10% deviation from theoretical values) were obtained for initial pressures between 0.5 mm Hg and approximately 30 mm Hg. This range includes, for a given drive burst pressure, the low pressure limitation of the shock tube, i.e., extremely short test times, and the high pressure limitation, i.e., the increased flowmeter internal impedance resulting from low shock Mach numbers. Pressure losses due to magnetic drag in the end regions of the flowmeter were found to be negligible. (Author)

AD-627 243 Fld. 14/2, 4/2, 18/4
CFSTI Prices: HC $3.00 MF $0.75
HRB-SINGER INC STATE COLLEGE PA
MOBILE GROUND TRUTH LABORATORY.
Final rept.,
by Harry Balmer, Robert Gray, William Cramer, and Frederick Ranck. Jan 66, 74p. Contract AF30 (602)-3461 Proj. AF-6244 Task 624410
RADC TR-65-277

Unclassified report

Descriptors: (*Laboratories, Aerial reconnaissance), (*Meteorological parameters, Recording systems), (*Radiation measurement systems, Recording systems), Mobile, Airborne, Meteorological instruments, Radiometers, Spectra (Infrared), Photographic intelligence, Thermal targets

The Mobile Ground Truth Laboratory (MGTL) was to be capable of recording radiological and meteorological data for use in studies of airborne sensor capabilities. Major design features were oriented to a self-sufficient unit able to operate both on and off improved roads in remote areas under various environmental conditions. The basic vehicle supplied for modification was a USAF M-109 shop van shown in figure 1. Instrument types were listed in the purchase request which would enable accurate records of physical phenomena to be obtained under a wide range of weather conditions. The major contractor-supplied equipment requirements were: Continuous temperature recording to plus or minus 2 degrees F; continuous relative humidity recording to plus or minus 5%; continuous wind velocity and direction recording to plus or minus 3 mph and the nearest 15 degrees, respectively; apparent radiation temperature in the infrared spectrum from 1 to 30 microns recorded by a single channel radiometer in a form that temperatures to one degree F may be determined (Provisions for the collection of data restricted to the 3 to 5 micron and 8 to 14 micron bands were also required); a transportable, well-regulated power supply capable of providing continuous operation of all equipment in the laboratory.

AD-627 247 Fld. 14/2, 13/8, 17/7, 13/10
CFSTI Prices: HC $2.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
CORRELATION METHOD OF MEASURING ROLLING SPEED; OTHER EXAMPLES OF USE OF THE CORRELATION METHOD FOR MEASURING SPEEDS,
by S. F. Kozubovskii. 1965, 38p. Rept. no.
Translation-1096
TT 66-60392

Unclassified report

Korrelyatsionnyi Method Izmereniya Skorosti Dvizheniya. Drugie Primery Primeneniya Korrelyatsionnogo Metoda Izmereniya Skorostu, trans. of mono. Avtomaticheskie Korrelyatsionnye Izmeriteli Skorosti, Kiev, 1963 p7-11, 57-79.

Descriptors: (*Velocity, Measurement), (*Rolling mills, Velocity), (*Boats, Velocity), (*Aircraft, Velocity), Automatic, Radio navigation, Spacecraft, Correlation techniques, USSR, Instrumentation

Translations are given for part 2 of Chapter 1 and for Chapter 5. CORRELATION METHOD OF MEASURING ROLLING SPEED: The method of the British Iron and Steel Research Association (BISRA) is regarded as more promising than the method of magnetic sparks. The BISRA method uses light strokes with their axes perpendicular to the direction of movement of the steel bar. The strokes are projected via an optical system on a moving metallic surface. OTHER EXAMPLES OF USE OF THE CORRELATIONAL METHOD FOR MEASURING SPEEDS: BISRA automatic correlational meter for measuring rolling mill speeds; correlational speed measuring devices for aircraft and for cosmic craft (including their radio navigational installations); correlating speed measuring device for river craft; other examples of the correlation method of speed measurement.

AD-626 870 See Fld. 18/4

AD-626 939 See Fld. 20/9

AD-627 007 See Fld. 20/9

AD-627 013 See Fld. 9/3

AD-627 021 See Fld. 8/14

AD-627 032 See Fld. 13/13

AD-627 041 See Fld. 20/1

AD-627 079 See Fld. 8/13

AD-627 159 See Fld. 20/6

AD-627 241 See Fld. 1/4

14/3. RECORDING DEVICES

AD-626 653 Fld. 14/3, 1/4, 9/5
CFSTI Prices: HC $3.00 MF $0.75
WHITTAKER CORP NORTH HOLLYWOOD CALIF
NINE-CHANNEL DATA ACQUISITION SYSTEM.
Final engineering rept. Aug 62-Feb 65,
by Charles R. Sackett, and Daniel Hobel. Sep 65, 91p. Contract AF33 (657)-9574 Proj. AF-1390 Task 139001
AFFDL TR-65-151

Unclassified report

Descriptors: (*Magnetic recording systems, Aircraft equipment), (*Aircraft equipment, Magnetic recording systems), (*Data storage systems, Aircraft equipment), Multiple operation, Recording systems, Mission profiles, Flight paths, Magnetic tape, Shock resistance, Fireresistant materials, Aviation safety

This report describes the Nine-Channel Data Acquisition System developed for the U. S. Air Force by the Electronics Division of Whittaker Corporation under Contract Number AF 33 (657)-9574. The Nine-Channel Data Acquisition System is designed for airborne recording and ground station reproduction of eight channels of flight information plus elapsed time. The system features a crash-proof magazine assembly to allow recovery of the recorded information in the event of a crash and subsequent fire. The Nine-Channel Data Acquisition System is intended for use in measuring and recording time histories of the principal flight parameters from which structural loads experienced by weapon systems in tactical roles can be detected. These structural loads can then be analyzed when the recorded data is processed and interpreted. (Author)

14/4. RELIABILITY

AD-626 759 See Fld. 16/4

AD-626 842 See Fld. 16/4

AD-626 992 See Fld. 13/8

AD-627 034 See Fld. 9/1

14/5. REPROGRAPHY

AD-627 117 Fld. 14/5
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
COMPUTING THE ALLOWABLE SCATTERING OF LIGHT IN AERIAL CAMERAS,
by V. M. Kopylov. 4 Jan 66, 10p. Rept. no. ftd-TT-65-1429
TT 66-60373

Unclassified report

Unedited rough draft trans. of Geodeziya i Kartografiya (USSR) n12 p39-42 1964.

Descriptors: (*Aerial cameras, Photographic lighting systems), (*Photographic lighting systems, Aerial cameras), Light, Scattering, Photographic contrast, Mathematical analysis, Aerial photography, USSR

AD-627 159 See Fld. 20/6

Field 15-MILITARY SCIENCES

15/2. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL WARFARE

AD-626 727 Fld. 15/2
CFSTI Prices: HC $3.00 MF $0.75
RESEARCH TRIANGLE INST DURHAM N C
STUDIES OF DECONTAMINATION EFFECTIVENESS.
Research memo.,
by Joseph T. Ryan, and J. D. Douglass,Jr.. 5 Aug 64, 95p. Rept. no. RM-156-11
Contract OCD-OS-64-56 Proj. RTI-OU-156 Task 3233B

Unclassified report

Descriptors: (*Decontamination, Effectiveness), Radiological contamination, Surfaces, Buildings, Urban areas, Radiation hazards

This report examines, by theory and by analysis of real structures, the reductions in intensity inside and outside NFSS buildings that can be brought about by decontaminating the accessible surfaces on and around the buildings. Specifically the report presents the theory and applies the theory to nine different NFSS buildings in order to: Determine the intensity reductions that can be achieved by decontamination methods applied to practical situations involving real physical structures. Determine the intensity reductions that can be achieved when the detector is located inside a structure and when the detector is located outside the structure. Determine the decontamination costs (equipment, water expended, radiation dose received by the decontamination crews) in achieving the intensity reductions. Determine the sensitivity of the achieved intensity reduction to the cleaning efficiency of the decontamination operation (and, therefore, to the type of decontamination method). Determine the relative importance of the various surfaces (roofs, paved roads, parking lots, etc.) that can be decontaminated to the intensity reduction that can be achieved. (Author)

15/3. DEFENSE

AD-626 770 See Fld. 13/13

AD-626 831 See Fld. 13/11

AD-626 984 See Fld. 6/8

AD-627 077 See Fld. 18/4

AD-627 206 See Fld. 5/4

15/5. LOGISTICS

AD-627 202 Fld. 15/5, 5/3
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
ECONOMIC REPLACEMENT POLICY. AN ABBREVIATED VERSION OF R-224,
Research memo.,
by Armen Alchian. 9 Apr 58, 34p. Rept. no. RM-2153

Unclassified report

See also PB-166 683.

Descriptors: (*Replacement theory, Logistics), (*Logistics, Replacement theory), (*Armed forces supplies, Replacement theory), Spare parts, Costs, Mathematical analysis, Economics, Computers

Contents: Chapter 1, Introduction. Chapter 2, Elements of the replacement problem: Costs, Service streams, Computational procedure, Electronic computer solutions, Limited period of service, Discrete changes. Chapter 3, Mathematical formulation: Notation in mathematical formulation, Exponential approximation -- computational methods, Limited period of service, Nonanalytic functional forms. Chapter 6, Some issues common to all applications: Service valuation, What rate of interest, Effect of uncertainty of forecasts, Related investment decisions, Applicability to air force equipment.

15/7. OPERATIONS, STRATEGY, AND TACTICS

AD-627 227 See Fld. 5/9

AD-627 228 See Fld. 5/9

Field 16-MISSILE TECHNOLOGY

16/1. MISSILE LAUNCHING AND GROUND SUPPORT

AD-626 845 See Fld. 22/4

16/2. MISSILE TRAJECTORIES

AD-627 057 See Fld. 9/6

16/3. MISSILE WARHEADS AND FUZES

AD-627 246 Fld. 16/3, 19/1
CFSTI Prices: HC $3.00 MF $0.75
DEPARTMENT OF THE NAVY WASHINGTON D C
MISSILE FUZES,
by A. N. Dorofeev. 1965, 69p. Rept. no. Translation-1071
TT 66-60391

Unclassified report

Trans. of mono. Vzryvateli Raket, Moscow, 1965, n. p.

Descriptors: (*Guided missiles fuzes, Handbooks), Design, Impact fuzes, Electric fuzes, Time delay fuzes, Proximity fuzes, Electromagnetic fuzes, Optical equipment, Radio proximity fuzes, Operation, Construction, USSR, Instruction manuals

Brief historical information is given on fuzes, and their classification is presented. The brochure also relates in popular form the principles of construction of fuzes of the impact, time and proximity types. A large part of the brochure is devoted to proximity fuzes. The brochure is intended for soldiers, and noncommissioned officers, cadets, military academies and the wide circle of civilian readers. In view of the limitation of information regarding the design of present fuzes, the principles of construction are illustrated on the basis of models of fuzes of the Second World War. The brochure is written from materials in open foreign and domestic literature. (Author)

16/4. MISSILES

AD-626 759 Fld. 16/4, 14/4
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
RELIABILITY MEASUREMENTS IN GUIDED MISSILES,
by T. S. Bills. Feb 56, 46p. Rept. no. tg-245-7
Contract NOrd-7386

Unclassified report

Descriptors: (*Guided missiles, Reliability), Guided missile components, Checkout procedures, Quality control, Reliability (Electronics), Statistical processes, Probability, Graphics, Performance (Engineering), Flight testing

Several useful techniques have been developed by the Applied Physics Laboratory for measurement of reliability in guided missiles. In addition to simplified approaches to probability theory, factual experimental data have been derived from current missile programs to demonstrate the practical use of exponential expressions in making reliability estimates. The general areas described in this paper are: (1) reliability definitions; (2) in-flight reliability analysis; (3) ground-test failure analysis; (4) component reliability indices; (5) reliability predictions; (6) base spares estimates; and (7) relationship of reliability to complexity. The liberal use of charts and graphs makes this document specially valuable to design engineers who may wish to obtain a brief but understandable insight into basic reliability studies in the field of guided missiles. (Author)

AD-626 763 Fld. 16/4
CFSTI Prices: HC $5.00 MF $1.00
NAVAL ORDNANCE LAB CORONA CALIF
INVESTIGATIONS OF THE DESIGN OF ADAPTIVE AUTOPILOT SYSTEMS,
by P. C. Palmore, and D. R. Totten. 4 Jan 66, 160p. Task R360-FR-104/211-1/R011-01-01
NAVWEPS 8834

Unclassified report

Descriptors: (*Guided missiles, Adaptive control systems), (*Adaptive control systems, Guided missiles), Attitude control systems, Stabilization systems, Systems engineering, Feedback, Actuators, Gain, Acceleration, Mathematical analysis

Basic adaptive control philosophies and techniques are discussed. Numerous parametric performance relationships are provided for both linear and nonlinear attitude and translational acceleration control systems. A number of primary problems are defined and a few applicable control techniques are examined. (Author)

AD-626 842 Fld. 16/4, 14/4
CFSTI Prices: HC $1.00 MF $0.50
NAVAL MISSILE CENTER POINT MUGU CALIF
ELIMINATION OF SUBSTANDARD PARTS BY ENVIRONMENTAL TESTING.
Miscellaneous publication,
by L. E. Matthews, and R. C. Binder. 20 Jan 66, 15p. Rept. no. NMC-MP-66-1

Unclassified report

Descriptors: (*Guided missiles, Reliability), (*Weapon systems, Environmental tests), Reliability (Electronics), Failure (Electronics), Defects (Materials), Life expectancy, Guided missile components, Maintainability, Checkout procedures

Electromechanical hardware such as missiles, in general, exhibit three life phases: early failure, useful life, and wearout. The primary cause of early failures are substandard strength parts. These substandard parts, frequently referred to as 'bugs,' are parts whose strengths are much less than the average strength of a normal or standard part. Substandard parts usually result from manufacturing defects or human errors in construction. The useful life period of a device is the period after all defective parts have been replaced and prior to the beginning of standard part wearout. The highest reliability is observed during the useful life period. Laboratory environmental tests are useful as a debugging procedure and as a means of investigating the reliability of a device with all parts of standard design strength. A series of debugging and failure rate tests were performed at the U. S. Naval Missile Center and the failure data were presented by a unique method, providing graphical representations of reliability versus time. The data provided definite indications of early failure and useful life phases. (Author) (Presented at the 35th Symposium on Shock and Vibration and Associated Environments, Oct. 1965)

Field 17-NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17/2. COMMUNICATIONS

AD-626 659 Fld. 17/2, 5/7, 9/2
CFSTI Prices: HC $3.00 MF $0.75
COMMUNICATION SCIENCES LAB UNIV OF MICHIGAN ANN ARBOR
TEMPORAL EFFECTS IN SPEECH ANALYSIS AND SYNTHESIS,
by Robert James Scott. Dec 65, 81p. Rept. no. CSL-15
Contract Nonr-1224 (22) Proj. NR-049-122

Unclassified report

Descriptors: (*Speech, Intelligibility), (*Speech recognition, Data processing systems), Voice communication systems, Analysis, Synthesis, Band-pass filters, Auditory perception, Automatic, Phonetics, Time, Amplifiers, Ear, Programming (Computers), Digital computers, Analog-to-digital converters, Linear systems, Correlation techniques, Tables

Two major methods of adjusting the time dimention of speech were investigated. One was linear time normalization and the other was arc-length time normalization. In the experiments conducted the distribution of spectral energy was derived by scanning the output of a bank of vocoder analyzer filters. A hybrid computing facility was employed to accomplish the various methods of speech time adjustment. The perceptual effects of time-adjusted synthesized utterances were investigated in an intelligibility test. A dichotic method of time-compression of speech was studied in which information from alternate time samples was supplied to alternate ears. A comparison of the linear and nonlinear methods of time normalization suggests that the arc-length method may be superior for use in automatic speech recognition. A number of potential applications of time adjusted speech and possibilities for future research are suggested. (Author)

AD-626 807 **See Fld. 9/2**

AD-627 001 **See Fld. 9/4**

AD-627 009 **See Fld. 17/8**

AD-627 084 **See Fld. 20/5**

AD-627 146 **See Fld. 9/5**

AD-627 163 **See Fld. 9/2**

17/2.1 RADIO COMMUNICATIONS

AD-626 675 Fld. 17/2.1, 6/3
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
THE SEARCH FOR A RATIONALE FOR INTERSTELLAR COMMUNICATIONS,
by Stephen H. Dole. Jan 66, 8p. Rept. no. P-3296

Unclassified report

Presented at the Annual Meeting of the American Association for the Advancement of Science (132nd), Berkeley, Calif. in a symposium entitled Communication with Extraterrestrial Life, 30 Dec 65.

Descriptors: (*Space communication systems, Theory), (*Space biology, Theory), (*Information theory, Space communication systems), Planets, Social communication, Space probes

The paper explores the motives that have been given, or that might lie behind the expressed desire to communicate with other intelligent life forms living elsewhere in our Galaxy.

AD-626 705 **See Fld. 17/7**

17/5. INFRARED AND ULTRAVIOLET DETECTION

AD-627 141 **See Fld. 9/5**

17/7. NAVIGATION AND GUIDANCE

AD-626 651 Fld. 17/7, 22/2
CFSTI Prices: HC $3.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
A SIMPLIFIED DOPPLER NAVIGATING SYSTEM,
by William H. Guier. 19 Dec 58, 71p. Rept. no. TG-328
Contract NOrd-7386

Unclassified report

Descriptors: (*Doppler navigation, Navigation satellites), (*Navigation satellites, Doppler navigation), Doppler systems, Position finding, Doppler effect, Data processing systems

This memorandum reports on a preliminary investigation into methods by which the computational requirements of the navigating station can be reduced and presents a preliminary estimate of the theoretical ultimate accuracy that is obtainable by simplified navigating techniques. To form a basis for the investigation, an example of a navigating system is given in which: (1) the navigational satellite's memory capacity is increased to enable the satellite's position (but not velocity) to be transmitted to the navigating station once every one to three minutes; (2) the navigating instrumentation integrates the received Doppler shift to obtain an experimental measure of the slant range to the satellite each time the satellite's position is received, and (3) the navigator estimates his position from four or more data points by (exclusively) hand computations. Using this example, it is estimated that the navigator can determine his position to an ultimate accuracy of about one-half mile with a maximum time for the hand computations being about forty minutes. Possible extensions of this approach to somewhat more sophisticated navigating methods are discussed briefly. (Author)

AD-626 705 Fld. 17/7, 17/2.1
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
FLIGHT TESTS OF THE OMEGA AIRCRAFT RECEIVER.
Interim rept. no. 7,
by A. F. Thornhill, and M. F. Williams. 22 Jan 63, 28p. Rept. no. NRL-MR-1392

Unclassified report

Descriptors: (*Radio receivers, Aircraft equipment), (*Radio navigation, Radio receivers), (*Air traffic control systems, Radio navi-

gation), Hyperbolic navigation, Very low frequency, Radio equipment, Flight testing

Results of test flights to Canada, Alaska, Washington State, Bermuda, the Azores, Italy, England, Iceland and the Labrador area were satisfactory. Maximum range of the Hawaii signal (3) kw radiated power) was about 6000 nautical miles. The Summit signal (2 kw) was satisfactory as far east as Naples, Italy, and as far west and north as Point Barrow, Alaska. The range of the Forestport signal (0.25 kw) extends as far west as the Pacific coast and as far east as England. These ranges will be less in high noise conditions and over some propagation paths. Potential accuracy of the system for aircraft was checked by a series of five flights over six check points on a 225-mile triangular course in the Washington, D. C. area. The flights were taken over a period of one month. The maximum deviation at the worst check point was about two miles and at the best check point about 0.8 mile. Omega appears to be an entirely feasible aircraft navigation system. The only aspects yet unproven are the ability of the receiver to operate continuously at extreme range (>5000 nautical miles) and/or during extreme noise conditions.

AD-626 657 See Fld. 1/4

AD-627 099 See Fld. 12/2

AD-627 247 See Fld. 14/2

17/8. OPTICAL DETECTION

AD-627 009 Fld. 17/8, 17/2
CFSTI Prices: HC $1.00 MF $0.50
HUMAN ENGINEERING LABS ABERDEEN PROVING GROUND MD
TARGET DETECTION USING BLACK-AND-WHITE TELEVISION STUDY III: TARGET DETECTION AS A FUNCTION OF DISPLAY DEGRADATION.
Technical memo.,
by Lynn C. Oatman. Sep 65, 24p. Rept. no. TM-12-65

Unclassified report

Descriptors: (*Television display systems, Target acquisition), (*Target acquisition, Television display systems), Combat surveillance, Detection, Tanks (Combat vehicles), Visual perception, Human engineering

Two previous studies have examined the probability of detecting an M-48 tank on a black-and-white closedcircuit television (TV) system, with apparently conflicting results. When only horizontal resolution was reduced to get resolutions of 300, 400, 600, and 800 lines, detection performance was essentially the same for the three highest resolutions, though significantly poorer for the 300-line resolution. Yet when resolution was reduced in both horizontal and vertical dimensions, 800-line resolution gave better detection performance than 450-line resolution did. Extraneous variables that could not be controlled -- such as uneven brightness and resolution on the TV monitors themselves -- made it difficult to interpret these results. Thus it was not clear whether the first result was an unlikely chance event or whether resolution's effect depends on the number of dimensions reduced. The present study replicated the first one to test its verifiability. Displays at all four levels of resolution were presented to 20 subjects, who were asked to indicate in which one of nine areas the tank appeared on the TV screen. The results verified those of the first study: the subjects detected targets about equally well with the 800-, 600-, and 400line resolutions, but their performance was significantly poorer with 300-line resolution. This finding suggests that, if resolutions are equal, reducing both horizontal and vertical dimensions will impair detection performance more than reducing just horizontal resolution (i.e., reducing bandwidth). (Author)

AD-627 217 Fld. 17/8, 5/9

CFSTI Prices: HC $3.00 MF $0.75
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
MOONLIGHT I. IDENTIFICATION OF STATIONARY HUMAN TARGETS.
Research memo.,
by John E. Taylor. Dec 60, 71p.

Unclassified report

Descriptors: (*Humans, Identification), (*Targets, Detection), (*Military training, Night warfare), Lowintensity illumination, Adaptation (Physiology), Moon, Light, Vision

The studies were conducted to determine low visibility identification curves for human targets as a function of: (1) Level of illumination, (2) Position of target, (3) Position of observer, (4) Night vision training of observer. Two experiments were conducted using four groups of basic trainees as subjects. The first experiment was conducted under no-moon illumination and the second, using the same subjects, was conducted under full moon. The variables in each experiment were (1) position of target (standing, kneeling, or prone), (2) position of observer (standing, kneeling, or prone), and (3) type of night vision training administered to each group (classroom training, field training, a combination of classroom and field training, or no training). It was concluded that the ability to identify human targets under low natural illumination is: (1) Directly related to level of illumination, (2) Directly related to size of target being observed, (3) Directly related to height of the observer's eyes above the ground under full-moon conditions, but not under no-moon conditions, (4) Not related to the short periods of night vision training employed in these studies.

AD-626 822 See Fld. 20/6

AD-627 245 See Fld. 20/6

17/9. RADAR DETECTION

AD-627 008 Fld. 17/9, 9/5
CFSTI Prices: HC $2.00 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
12-HORN MONOPULSE ANTENNA SYSTEM FOR MILLSTONE HILL RADAR.
Technical rept.,
by Charles A. Lindberg. 15 Jun 65, 38p. Rept. no. TR-393
Contract AF19 (628)-500 Proj. AF-649L
ESD TDR-65-238

Unclassified report

Descriptors: (*Space surveillance systems, Radar tracking), (*Monopulse radar, Tracking), Performance (Engineering), L band, Parabolic antennas, Antenna feeds, Antenna radiation patterns, Transmission lines, Waveguides

The 440-Mcps conical-scan tracker at the Millstone Hill radar site has been converted to an L-band 12-horn monopulse tracker utilizing a Cassegrain optics reflector system. The amplitude sensing monopulse feed illuminates a 10-foot subreflector and thence an 84-foot-diameter paraboloid with linear or either sense of circular polarization. This system conversion increased the capabilities of the radar complex in that higher antenna gain and increased tracking sensitivity are obtained. The merits of the 12-horn system have been proven with actual results substantiating the theoretical predictions. This report discusses the design considerations and final performance characteristics of the overall antenna system and its individual components. (Author)

AD-626 764 See Fld. 9/5

AD-627 089 See Fld. 1/3

17/10. SEISMIC DETECTION

AD-626 777 Fld. 17/10, 8/11
CFSTI Prices: HC $5.00 MF $1.00
TEXAS INSTRUMENTS INC DALLAS
LARGE APERTURE SEISMIC ARRAY FINAL SPECIFICATIONS REPORT.
Final rept., 1 Oct 64-30 Jun 65,
by Hubert M. Rackets. Aug 65, 160p. Contract AF33 (657)-13899 Proj. VT-5053

Unclassified report

Installation, Engineering and Seismological Studies, Specification.

Descriptors: (*Seismological stations, Installation), (*Nuclear explosions, Detection), Seismographs, Noise, Superlow frequency, Specifications, Seismic waves, Systems engineering, Signal-to-noise ratio, Drilling, Performance (Engineering)

This report describes the installation of Angela and Hysham subarrays of the Large Aperture Seismic Array (LASA). Each subarray consists of 24 peripheral instruments located on six radials. At each location within the subarrays a borehole was drilled approximately 200 ft deep, cased and cemented. A Hall-Sears HS-10 seismometer was then lowered into each borehole. Data from the seismometers are amplified at the wellhead of each borehole and transmitted to a central gathering point by buried cable. Lightning protectors were installed. Data from the two subarrays was used in carrying out two studies. First, the subarray systems were evaluated from an engineering viewpoint in order to determine those elements and characteristics which would affect the desired performance of the array. Second, characteristics of the seismic information field (signal and noise) were determined within a single subarray and between the two subarrays. Summarizing the results from the engineering study, the system noise with the seismometer replaced by its equivalent resistance is about 30 to 35 db below the ambient seismic noise at 1.0 cps. This is an improvement of 8 to 12 db of separation over previous array systems at CPO, UBO and BMO. (Author)

AD-627 038 See Fld. 8/11

AD-627 039 See Fld. 8/11

AD-627 040 See Fld. 8/11

AD-627 051 See Fld. 8/11

Field 18-NUCLEAR SCIENCE AND TECHNOLOGY

18/1. FUSION DEVICES (THERMONUCLEAR)

AD-627 261 Fld. 18/1, 20/9
CFSTI Prices: HC $1.00 MF $0.50
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
INVESTIGATION OF THE UNIVERSAL INSTABILITY IN A THERMAL PLASMA DEVICE (Q-MACHINE).
Technical note,
by Herbert Lashinsky. Sep 65, 23p. Rept. no. BN-415
AFOSR 65-2053

Unclassified report

Preprint of paper presented at the International Conference on Plasma Physics and Controlled Nuclear Fusion Research (2nd), Culham England, 6-10 Sep 65.

Descriptors: (*Plasma medium, Stability), (*Thermonuclear reactions, Control), Plasma oscillations, Plasma sheath, Turbulence, Magnetic pinch, Thermoelectricity

Results are described that were mental investigations of the so-called universal (drift-wave) instability in a weakly inhomogeneous fully ionized plasma column confined by a strong magnetic field.

18/2. ISOTOPES

AD-627 026 See Fld. 20/8

AD-627 027 See Fld. 20/8

18/3. NUCLEAR EXPLOSIONS

AD-626 946 Fld. 18/3, 18/4
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
UTILIZATION OF RIOMETERS FOR THE DETECTION OF NUCLEAR EXPLOSIONS IN SPACE,
by B. C. Potts. Jan 66, 31p. Rept. no. RM-4760-ARPA
Contract SD-79 ,ARPA Order-189-61
Unclassified report

Descriptors: (*Riometers, X rays), (*Nuclear explosions, Detection), Radiation measurement systems, Absorption, Noise, Antennas, Ionosphere, Temperature, High altitude

The memorandum considers the detection of overhead nuclear explosions in space by riometer measurement of the effects of explosion-induced ionization on the absorption of high-frequency cosmic noise. The induced ionization is calculated as a function of height and time for a 1-kT X-ray impulse having temperatures of .5, 1.0, and 2.0 kev and having burst heights from 1,000 to 100,000 km. The absorption at each height due to the induced ionization is then calculated at a radio frequency of 30 Mc. In order to determine the change in the effective antenna temperature as a function of time at the riometer, the total absorption through the ionosphere is then determined. The response of a riometer with several time constants is found for this sharp change in received cosmic noise power. Detection ranges are calculated for each X-ray temperature and several possible riometer time constants based on the criterion that the nuclear burst must produce a 1-db peak response in the diode current of the riometer. These detection ranges are tabulated and compared with those that were found neglecting riometer response time. (Author)

AD-626 694 See Fld. 4/1

AD-626 770 See Fld. 13/13

AD-626 899 See Fld. 8/13

AD-627 014 See Fld. 18/8

18/4. NUCLEAR INSTRUMENTATION

AD-626 870 Fld. 18/4, 14/2
CORNELL UNIV ITHACA N Y
SPECTRAL MEASUREMENTS WITH ALIGNED AND MISALIGNED TWO-CRYSTAL SPECTROMETERS. II. ALIGNMENT,
by Herbert W. Schnopper. 7 Dec 64, 10p. Contract AF49 (638)-402 Proj. AF-9761 Task 976103
AFOSR 65-1986
Unclassified report

Availability: Published in Journal of Applied Physics v36 n4 p1423-30 Apr 1965. Copies to DDC users only.

Descriptors: (*Nuclear radiation spectrometers, Alignment), Measurement, X-ray spectrum, X-rays, Crystals, Beams (Electromagnetic)

Conditions for and methods of aligning a two-crystal spectrometer are discussed. These include the alignment of rotation axes, crystals, and x-ray beam. The results of a new nondispersive crystal alignment procedure are compared in detail with theory for a typical case of CuKalpha radiation and calcite crystals. This method is contrasted with other procedures which lead only to pseudo-alignments. It is shown that x-ray methods which are sensitive to vertical divergence do not lead to crystal alignment unless the beam is already perfectly aligned. It is concluded that the x-ray beam can be aligned only after the crystals have been aligned. (Author)

AD-626 998 Fld. 18/4, 6/18
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
CALCULATED RESPONSE OF AIR-WALL DOSIMETERS OR GEIGER-MUELLER TUBES TO MONOENERGETIC PHOTONS BETWEEN 1 AND 10 MEV,
by A. Redmond. 13 Dec 65, 28p. Rept. no. USNRDL-TR-944
Proj. SF-011-05-04 Task 6191
Unclassified report

Descriptors: (*Photons, Measurement), (*Dosimeters, Photons), (*Geiger counters, Photons), Air, Electrons, Absorption (Physical), Radiological dosage, Gamma rays

The question of registering dose from weapon and reactor photons of 2 to 10 MeV energy has led to a study of the capability of conventional dosimeters and GeigerMueller tubes to respond accurately to these energies. The cases are analyzed of 1/16-in. and 1/8-in. air wall dosimeters under bombardment with these high energy photons, and also under bombardment with these photons plus the electron flux density coming from an air absorber of sufficient thickness to ensure primary to secondary radiation equilibrium. Dosimeters of two different wall thicknesses, 2.5 and 5 grams-sq cm, are studied, the latter of which can reach primary-tosecondary equilibrium under 10 MeV photons (and, of course, under all lower energies). The attenuation of the primary flux density is relatively small even at the larger thickness. The results given in tables and a graph show that the thin wall dosimeters will give a distorted indication of dose at higher energies. The chamber with 5 grams per square centimeter wall responds in constant ratio to the response of the ideal air wall chamber for photons from 1 to 10 MeV and can therefore be used under all conditions for a register of dose.

AD-627 000 Fld. 18/4, 18/8
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
CHARACTERISTICS OF K40 DISTRIBUTED SOURCES IN WATER,
by Edward J. Wesley, and Richard A. Nyberg. 23 Nov 65, 23p. Rept. no. USNRDL-TR-937
Proj. SR-104-03-01 Task 0584
Unclassified report

Descriptors: (*Water, Radioactivity), (*Radiation measurement systems, Underwater), (*Underwater equipment, Radiation measurement systems), (*Gamma rays, Underwater), Radioactive isotopes, Potassium, Gamma-ray spectra, Crystal counters, Sea water

Measurements on K40 gamma rays from a distributed source in water are reported. The data are presented in terms of the pulse height spectra and count rates observed as the size of the source was increased from a small pool surrounding the detector to an 'infinite' distributed source and then the infinite source was viewed through increasing thicknesses of water. This work was accomplished by using solutions of a potassium salt in graduated spherical balloons which encompassed the detector and were themselves completely surrounded by fresh water. The report characterizes the predominantly low-energy pulse pulse height spectra observed from sources in water using large crystal detectors, particularly when the source is separated from the detector and emphasizes the need for consideration of this spectra when designing pressure vessels for underwater detection systems requiring maximum sensitivity. A count rate build-up factor was calculated for the increasing thickness of absorber and compared to calculated values for doserate build-up factors at the same primary energy. (Author)

AD-627 077 Fld. 18/4, 15/3
CFSTI Prices: HC $4.00 MF $0.75
EDGERTON GERMESHAUSEN AND GRIER INC SANTA BARBARA CALIF
DASA FALLOUT AND TRANSIT DOSE RATE MEASUREMENT SYSTEM.
Phase 1, May 64-Jul 65,
by James E. Brown, and R. I. A. Webb. Dec 65, 118p. Contract DA-49-146-XZ-292
NDL TR-71,1688
Unclassified report

Descriptors: (*Radioactive fallout, Radiation measurement systems), (*Radiation measurement systems, Radioactive fallout), Dose rate, Measurement, Real time, Data processing systems, Data transmission systems, Telemeter systems, Nuclear explosions

The report presents the results of a study and design effort that demonstrates the feasibility of an improved system for the measurement and collection of residual radiation dose rate information. The improved system consists of as many as 100 data collection points at which up to 200 detectors may be located. Data are telemeteredto a centrally located online computer for real time computation. Suitable performance characteristics and system compatibility have been demonstrated by an experimental detector station fabricated for test and evaluation. Other system components were selected from available off-the-shelf commercial items. Included in the system is a provision for differentiation between the dose rate contributed by the deposited fallout and the transit dose rate. (Author)

AD-626 828 See Fld. 14/2

AD-626 946 See Fld. 18/3

AD-627 243 See Fld. 14/2

18/8. RADIOACTIVITY

AD-627 014 Fld. 18/8, 6/18, 18/3
CFSTI Prices: HC $2.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
THE NATURE OF RADIOACTIVE CONTAMINATION AND METHODS OF PROTECTION AGAINST IT,
by A. S. Zubkin, and V. A. Medvedev. Dec 65, 44p. Rept. no. FSTC-381-T65-669
TT 66-60354
Unclassified report

Trans. of mono. Chto Takoe Radioaktivnoe Zarazhenie i Sposoby Zashchity ot Nego Atomizdat, Moscow, 1964.

Descriptors: (*Radiological contamination, Safety devices), (*Nuclear explosions, Radioactive fallout), Radioactivity, Radiation injuries, Radiation hazards, Radioactive isotopes, Fallout shelters, Radiation sickness, Radiological dosage, Population, Decontamination, USSR

Contents: Radioactive contamination; Formation of radioactive substances as a result of nuclear explosions; Fundamental properties of radioactive substances; Damaging action of radioactive radiation; Nature and scales of radioactive contamination; Protection against the injurious action of radioactive substances; Methods and means of achieving protection under conditions of radioactive

contamination; Order in which protective measures are carried out; Rules governing conduct under conditions created by radioactive contamination.

AD-627 073 Fld. 18/8, 20/12
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
THE EFFECTS OF GAMMA AND X-RAYS ON THE ELECTRICAL PROPERTIES OF CADMIUM-SELENIUM AND CADMIUM-SULFUR SEMICONDUCTORS,
by M. A. Talibi. 20 Dec 65, 16p. Rept. no. FTD-TT-64-1161
TT 66-60363

Unclassified report

Edited trans. of Akademiya Nauk Azerbaidzhanskoi SSR, Baku. Institut Fiziki i Matematiki. Trudy. Seriya Fizicheskaya, v9 p10-9 1958.

Descriptors: (*Semiconductors, Radiation damage), (*Radiation damage, Semiconductors), (*Cadmium alloys, Selenium alloys), (*Cadmium compounds, Sulfur compounds), Electrical properties, Gamma rays, X rays, USSR

AD-626 892 **See Fld. 20/12**

AD-627 000 **See Fld. 18/4**

AD-627 049 **See Fld. 11/9**

18/9. REACTOR ENGINEERING AND OPERATION

AD-626 861 Fld. 18/9
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-PATTERSON AFB OHIO
PRE-STARTUP HYDRAULIC TESTS AT THE AIR FORCE NUCLEAR ENGINEERING TEST FACILITY.
Final rept. 1961-1965,
by Frederick B. Buoni, Laszlo B. Hary, Valta G. Lewisand , and Edward J. Vallish. Oct 65, 50p.
Rept. no. AFFDL-TR-65-131
Proj. 7001 Task 700114

Unclassified report

Descriptors: (*Reactor coolants, Fluid flow), (*Heterogeneous reactors, Reactor coolants), Nuclear physics laboratories, Air force research, Test facilities, Reactor cores, Reactor fuel rods, Distribution, Velocity, Pressure, Hydraulic systems

Hydraulic measurements were performed in the reactor to determine coolant distribution in the core. This study consisted of three parts: the flow through each of the four control rod fuel followers; the coolant velocity through flow channels of representative core positions; and, pressure differentials between coolant channels within several core positions. Flow velocity through the shimrod assemblies was of prime interest. This was obtained with a pitot-static tube inserted in the poison section of the dummy assembly, which was then placed in a test loop and calibrated against a previously calibrated Potter turbine flowmeter. The assembly was then inserted into the core and leads were brought out, and was eventually run in each shim-rod position under varying flow conditions. Results were reproducible and verified design values. Flow velocities in the fuel element channels were directly measured using the salt-velocity method. Thirty of the 41 core stationary element positions were tested, and the results, while generally verifying calculated values, did exhibit variation with position. The final phase of the program consisted of instrumenting a dummy fuel element with eleven static pressure probes and to insert this element into the core in various positions to study the absolute and differential pressure between fuel plates, end plates, and side plates of the element in various positions, and to verify the design pressure drop across the core. (Author)

18/10. REACTOR MATERIALS

AD-626 701 **See Fld. 11/6**

18/11. REACTOR PHYSICS

AD-626 757 Fld. 18/11
CFSTI Prices: HC $4.00 MF $0.75
COLUMBIA UNIV NEW YORK PLASMA LAB
U-235 RESONANCE CROSS SECTIONS AND GASEOUS CORE REACTOR CALCULATIONS,
by Gunter W. Tumm. Aug 65, 108p. Rept. no. 22
Contract AF49 (638)-1254 ,AF49 (638)-1634

Unclassified report

Descriptors: (*Uranium, Nuclear Resonance), (*Nuclear resonance, Probability), (*Nuclear reactors, Numerical analysis), Integrals, Reactor cores, Plasma medium, Buckling (Neutron density), Temperature coefficient of reactivity, Neutron flux, Critical assemblies, Reactor fuels, Compressive properties

Contents: Calculational methods (the HRG-program); Functional dependence of resonance integrals on temperature and dilution; Resonance integrals of U-238 and comparison with experiment; Resonance integrals of U-235 by HRG-program; Revision of HRG-program; Resonance integrals of U-235 by revised HRG-program and comparison with experimental results; Selection of gaseous core reference system; Final cross section calculations and comparison with LASL 6-and-16 group cross sections; Effect of buckling and dilution slowing down flux; Estimate of doppler coefficient of reactivity; Check of homogenization assumption and comparison with previous theoretical results; Doppler temperature coefficient of reactivity; Comparison with measured critical masses; Variation of critical mass under 'interior' and 'exterior' fuel compression.

AD-626 913 Fld. 18/11
HARVARD UNIV CAMBRIDGE MASS
REACTOR CRITICALITY IN NEUTRON TRANSPORT THEORY,
by G. Birkhoff. 1963, 26p. Contract Nonr-1866 (34) Proj. NR-041-188

Unclassified report

Availability: Published in Rendiconti di Matematica (Rome) v22 n1/2 p102-26 1963.

Descriptors: (*Neutron transport theory, Reactor kinetics), (*Reactor kinetics, Neutron transport theory), Critical assemblies, Multiplication factor, Functional analysis, Mathematical models, Integral equations

In the theory of neutron chain reactions, a central role is played by the related concepts of multiplication factor, criticality, persistent or dominant distribution, and importance function. A challenging mathematical problem of nuclear reactor theory is to deduce the existence of these related entities rigorously from the basic assumptions of neutron transport theory. The present paper represents a first attack on this problem, using methods briefly described in a previous work. (Author)

AD-627 235 Fld. 18/11, 9/2
CFSTI Prices: HC $5.00 MF $1.00
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
A COMPUTER PROGRAM FOR CALCULATING FISSION PRODUCT ABUNDANCES,
by Michael A. Hogan, John K. Crawford, and V. Goddard. 15 Oct 65, 172p. Rept. no. USNRDL-TR-921
Task 18
AFOSR

Unclassified report

Descriptors: (*Fission products, Abundance), (*Programming (Computers), Radioactive decay), Decay schemes, Reactor kinetics, Reactor operation, Reactor materials, Isotope availability

The Fission Product Abundances Program is a generalized digital computer method for calculating time dependent abundance of fission products. The times at which the abundances are calculated, the reactor operating history, and the fission type (fissile material and fission spectrum) are all input variables. In addition, several different o tputs are available. The combination of these features yields a very general program intended to meet the needs of many users. (Author)

Field 19-ORDNANCE

19/1. AMMUNITION, EXPLOSIVES, AND PYROTECHNICS

AD-626 702 **See Fld. 19/4**

AD-626 821 **See Fld. 7/3**

AD-626 835 **See Fld. 19/6**

AD-627 246 **See Fld. 16/3**

AD-627 257 **See Fld. 21/2**

19/4. EXPLOSIONS, BALLISTICS, AND ARMOR

AD-626 702 Fld. 19/4, 7/4, 19/1
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
RADIATION SPECTRUM OF A DETONATING WAVE IN NITROMETHANE,
by A. N. Dremin, and S. D. Savrod. 1965, 6p.
Rept. no. Translation-2004
TT 66-60267

Unclassified report

Trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n1 p103-5 1965.

Descriptors: (*Organic nitrogen compounds, Detonation waves), (*Detonation waves, Spectroscopy), (*Explosive materials, Spectroscopy), Continuous spectrum, Shock waves, Explosion gases, Luminescence, USSR

The radiation spectra of a detonation front in nitromethane in the area of 3800-8000A were obtained on a spectrograph of average dispersion. The spectra were continuous with no lines or molecular bands. Preliminary measurements have shown that the distribution of energy in the spectrum differs from that of Planck.

AD-627 150 Fld. 19/4, 12/1
CFSTI Prices: HC $3.00 MF $0.75
NAVAL WEAPONS LAB DAHLGREN VA
THE NEAR MAXIMUM TIME STEP FOR RIGID BODY INTEGRATION USING THE FRICK SLIP FRAME,
by P. Daniels, and C. W. Ingram. 23 Dec 65, 62p.
Rept. no. NWL-2002

Unclassified report

Descriptors: (*Integration, Equations of motion), (*Projectile trajectories, Equations of motion), (*Spin-stabilized ammunition, Trajectories), Optimization, Numerical analysis, Time, Aerodynamics

A method is derived for determining the near optimum spin scale factor and the near maximum time

step for integration of the trajectories of spinning symmetrical missiles using the Frick slip frame. The trajectories of a typical spin-stabilized projectile and a fast spinning statically stable missile were computed in order to evaluate the method. The results of this study indicate that the technique is valid for missiles with moderate yaw. (Author)

AD-627 153 Fld. 19/4
CFSTI Prices: HC $1.00 MF $0.50
FELTMAN RESEARCH LABS PICATINNY ARSENAL DOVER N J
EQUATIONS OF MOTION FOR MISSILES WITH SIX DEGREES OF FREEDOM. PART I. FORCES AND TORQUES ACTING ON THE MISSILE,
by S. L. Gerhard. Jan 60, 17p. Rept. no. ORDBB-TK-432
Unclassified report

Descriptors: (*Projectile trajectories, Equations of motion), (*Torque, Projectile trajectories), (*Force (Mechanics), Projectile trajectories), Aerodynamic characteristics, Spin, Drag, Magnus force, Yaw, Pitch (Motion), Roll

The physical factors underlying the numerous aerodynamic coefficients are discussed. Mechanical factors for spinning and non-spinning missiles, forces and torques, Magnus factors, missile asymmetry, jet factors, and guidance factors are considered.

AD-626 899 See Fld. 8/13

AD-627 254 See Fld. 20/3

19/6. GUNS

AD-626 835 Fld. 19/6, 19/1
CFSTI Prices: HC $1.00 MF $0.50
SPRINGFIELD ARMORY MASS
BIBLIOGRAPHY OF SPRINGFIELD ARMORY TECHNICAL REPORTS AND MEMORANDUM REPORTS (1 JANUARY 1964 - 30 JUNE 1965),
15 Nov 65, 25p. Rept. no. sa-TR20-9104
Unclassified report

Descriptors: (*Bibliographies, Army research), (*Ordnance, Bibliographies), Abstracts, Reports, Weapons, Gun components, Guns, Phosphate coatings, Wear resistance, Mechanical properties, Non-destructive testing, Ammunition, Ammunition components

This Bibliography is a compilation of Technical Reports and Memorandum Reports prepared and published by Springfield Armory Research and Engineering Division. The Bibliography covers the period from 1 January 1964 to 30 June 1965. This Bibliography also includes abstracts of the Technical Reports. (Author)

AD-627 219 See Fld. 5/9

AD-627 220 See Fld. 5/9

Field 20-PHYSICS

20/1. ACOUSTICS

AD-626 800 Fld. 20/1
CFSTI Prices: HC $1.00 MF $0.50
J G ENGINEERING RESEARCH ASSOCIATES BALTIMORE MD
SOME THOUGHTS ON NEAR FIELD, FAR FIELD NOISE PREDICTION.
Informal note,
by Joshua E. Greenspon. 1964, 4p. Contract Nonr-5040 (00)
Unclassified report

Descriptors: (*Noise, Mathematical prediction), (*Mathematical prediction, Integral transforms), Fourier analysis, Stochastic processes, Acoustics, Harmonic analysis, Time

AD-626 934 Fld. 20/1
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
CALCULATION OF THE MONOSTATICALLY REFLECTED VELOCITY POTENTIAL IN THE FAR FIELD OF CERTAIN FINITE RIGID BODIES.
Interim rept.,
by A. J. Rudgers. 3 Dec 65, 36p. Rept. no. NRL-6285
Proj. RF-101-03-45-5252
Unclassified report

Descriptors: (*Sound, Reflection), (*Velocity, Potential theory), Field theory, Acoustic properties, Geometry, Series, Integral equations, Bodies of revolution, Spheres, Ellipsoids, Cylindrical bodies, Conical bodies

An existing theory of acoustic reflection, applicable in the far field and embodying the Kirchhoff approximation, is used to calculate the velocity potential of the acoustic wave monostatically reflected from certain rigid bodies. Where possible, a reflection summation formula is applied in these calculations that is written in terms of a few simple geometrical parameters of the reflecting body. The limiting forms of the summation-formula results are found. These forms are identical to results which can be derived according to a well-known reflection integral. A comparison of the approximation of the reflection summation formula to the reflection integral is discussed for certain bodies. General formulae are derived which may be applied to any reflecting object whose surface can be generated by a conic section, or to segments and frustums of such objects. A limitation of calculation schemes based on the summation formula is discussed and illustrated by calculating the velocity potential of the wave reflected from a short, rigid, right-circular cylinder according to the reflection integral. Results of the calculations are discussed in terms of the geometrical parameters employed in the reflection summation formula. (Author)

AD-627 041 Fld. 20/1, 14/2
CFSTI Prices: HC $3.00 MF $0.75
NAVAL SUBMARINE BASE NEW LONDON CONN ACOUSTICAL RESEARCH AND DEVELOPMENT DIV
INSTRUMENTATION FOR ACOUSTIC AND VIBRATION MEASUREMENTS.
Technical rept.,
by Robert York Chapman. 1 Jan 66, 83p. Rept. no. TR-224-66
Proj. S-F013-11-07
Unclassified report

Descriptors: (*Acoustic equipment, Specifications), (*Sound, Measurement), (*Vibration, Measurement), Accelerometers, Transducers, Stroboscopes, Graphics, Recording systems

This technical report contains operational procedures for the General Radio Sound Level Meter Type 1551-B/C, Endevco Accelerometer and Control Box Type 1560-P13, Sound and Vibration Analyzer Type 1564-A, Graphic Level Recorder Type 1521-A, Vibration Calibrator Type 1557-A and the Strobotac Electronic Stroboscope Type 1531-A. These instruments manufactured by the General Radio Company are presently authorized for SS (N) and FBM Class Submarines. The intent of this report is to publish, in one assembly, practical information on the operations of a complete sound and vibration measuring system. (Author)

AD-627 078 Fld. 20/1, 12/1
CFSTI Prices: HC $2.00 MF $0.50
J G ENGINEERING RESEARCH ASSOCIATES BALTIMORE MD
INTEGRAL EQUATION SOLUTION FOR A FREE FLOODING CYLINDRICAL SOUND RADIATOR OF FINITE LENGTH.
Technical rept.,
by Joshua E. Greenspon. Sep 65, 27p. Rept. no. TR-14
Contract Nonr-2733 (00) Proj. R-185-300
Unclassified report

Descriptors: (*Underwater sound generators, Cylindrical bodies), (*Integral equations, Numerical analysis), Programming (Computers), Transducers, Potential theory

The solution for the finite free flooding cylinder is built up from the solution for a ring on an infinite rigid baffle. The velocity in the field at the ends of the cylinder is the solution of an integral equation which was originally derived by Junger. A computer program has been developed for solving this integral equation and for obtaining the radiation impedance of the cylinder. It is found that the velocity near the ends of the cylinder is highly attenuated within 1/8 wave length away from the ends. Just at the ends the velocity changes radically but this violent changing stops at less than 1/4 wave length from the ends of the cylinder, at which point a regular attenuated sine wave starts. (Author)

AD-627 097 Fld. 20/1, 20/3
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF RESEARCH LABS
PARAMAGNETIC RESONANT ABSORPTION OF MICROWAVE PHONONS IN ZERO FIELD,
by W. I. Dobrov. 11 Oct 65, 3p.
Unclassified report

Availability: Published in Physical Review Letters v15 n20 p789-91 15 Nov 1965. Copies to DDC users only.

Descriptors: (*Phonons, Absorption), (*Paramagentic resonance, Absorption), Ultrasonic radiation, Magnetic fields

An intense, magnetic field-dependent interaction was observed between 10-kMc/sec longitudinal acoustic waves and Dy (3+) ions in CaF2. In a sample containing 0.16% Dy ions, ultrasonic absorption was maximum at or near H = 0, and it was observed to decrease with increasing magnetic field until reaching a field-independent value at H approximately = 4000 Oe.

AD-627 100 Fld. 20/1, 20/3
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF RESEARCH LABS
COHERENT SPIN-WAVE-PHONON INTERACTIONS IN THIN MAGNETIC FILMS,
by P. E. Wigen, W. I. Dobrov, and M. R. Shanabarger. 12 Jul 65, 7p.
Unclassified report

Availability: Published in The Physical Review v140 n5A pA1827-33 29 Nov 1965. Copies to DDC users only.

Descriptors: (*Phonons, Magnetic fields), (*Magnetic materials, Ultrasonic radiation), Films, Excitation, Nickel alloys, Iron alloys

Three types of magnetoelastic interaction processes were studied experimentally in thin Permalloy films at X band: (a) phonon excitation by spin waves, (b) spin-wave excitation by phonons and re-excitation of spin waves by phonons which were originally produced by spin waves. The observations were made in films with compositions varying from 77% Ne, 23% Fe to 85% Ni, 15% Fe, and in each case distinct spin-wave modes, up to n=14, were observed and a one-to-one correspondence between the modes of various interactions could be determined. The data were analyzed on the basis of a spatial inhomogenelty in the internal field as treated by Kooi. The attenuation of piezoelectrically generated and detected phonons by spin waves was measured and a value for the magnitude of the transverse magnetoelastic constant

M = 1.5X10 to the 7th power erg/cc was obtained for a film of 85% Ni-15% Fe. Using the measured value of M, conversion coefficients were computed for the a, b, and c processes. Comparison with experiment yields a discrepancy of approximately 5 dB for the a and b processes and about 15 dB for the c process for the modes n<6. The calculated value of the magnetoelastic constant, the mode-number dependence of the spin-wave-phonon interaction intensities for a, b, and c, and the frequency dependence of the c process strongly favor the volume-inhomogeneity model over the surface-spin-pinning model in the measured films. (Author)

AD-627 181 Fld. 20/1, 5/6
CFSTI Prices: HC $4.00 MF $1.00
ILLINOIS UNIV URBANA ELECTRICAL ENGINEERING RESEARCH LAB
A TECHNIQUE FOR THE ANALYSIS OF MUSICAL INSTRUMENT TONES,
by Morris David Freedman. Oct 65, 146p.
Rept. no. TR-6
Contract AF-AFOSR-7-64 ,PHS-GM-10718-03
Proj. AF-9769 Task 976904
AFOSR 65-2293

Unclassified report

Descriptors: (*Sound pitch, Mathematical analysis), (*Music, Sound pitch), Digital computers, Acoustics, Harmonic analysis, Fourier analysis, Approximation (Mathematics), Integral transforms

A technique to analyze the transient part of a musical tone was developed. The analysis was carried out on Illiac II, a high-speed digital computer, the signals being presented to the computer through an analogdigital converter. The analysis procedure consists of four steps: (1) The determination of an adequate mathematical specification for an equation which will represent the sound pressure wave generated by an instrument; (2) The determination of the constants in the equation for a given tone. (No assumption is made regarding the frequencies of the partial tones. Inharmonic partials are detected and accounted for in the specification function.); (3) The verification of the results, both mathematically and by resynthesis of the tone (using Illiac II) to check the adequacy of the representation (The former technique yields a more sensitive measure of error.); (4) Iterating, if necessary, to improve the results. At this stage, the original specification function may be altered, if necessary. A great deal of success was obtained with this scheme and resynthesis has proven to be quite successful. (Author)

AD-626 718 See Fld. 21/8

AD-626 719 See Fld. 21/9

AD-626 720 See Fld. 21/8

AD-626 721 See Fld. 21/9

AD-626 722 See Fld. 21/8

AD-626 723 See Fld. 21/8

AD-626 724 See Fld. 21/8

AD-626 736 See Fld. 21/8

AD-626 737 See Fld. 20/11

AD-626 738 See Fld. 20/11

AD-626 739 See Fld. 21/8

AD-626 740 See Fld. 21/8

AD-626 741 See Fld. 21/8

AD-626 742 See Fld. 21/9

AD-626 756 See Fld. 21/8

20/2. CRYSTALLOGRAPHY

AD-626 778 Fld. 20/2
MUSEO NACIONAL DE CIENCIAS NATURALES MADRID (SPAIN) DEPARTAMENTO DE CRISTALOGRAFIA
CROSS-GLIDING OF DISLOCATIONS IN PYRITE SURFACE (DESLIZAMIENTO CRUZADO ('CROSS-GLIDING') DE DISLOCATIONES EN LA SUPERFICIE DE LA PIRITA),
by J. L. Amoros, and M. T. Pascual. 1964, 6p.
Contract AF-EOAR-62-92 Proj. AF-9763
Task 976302
AFOSR 65-1923

Unclassified report

Text in Spanish. Abstract in English.

Availability: Published in Estudios Geologicos v20 p73-8 Nov 1964. Copies to DDC users only.

Descriptors: (*Pyrites, Crystal lattice defects), Etching, Fracture (Mechanics), Surfaces, Crystals, Spain

Cross-gliding of dislocations has been observed in pyrite through slight etching of the free (old) surface. The crossgliding mechanism is believed to start when the surface is freed of the oxidized bonded coating by the etching technique. Such mechanism gives rise to two different phenomena, one of which is related to the annihilation of dislocations of opposite sign. The intrinsic notch brittleness of pyrite crystals is reveled via micro-crack nucleation. Micro-cracks are reveled also via etching, and the mechanism is associated to the anchoring effect of the oxide coating of the old pyrite surface. (Author)

AD-626 802 Fld. 20/2
BATTELLE MEMORIAL INST COLUMBUS OHIO
ENUMERATING NEAR NEIGHBORS.
Published paper,
by Van E. Wood. 7 Dec 64, 5p. Contract AF-AFOSR-260-63 Proj. AF-9761 Task 976101
AFOSR 65-2568

Unclassified report

Availability: Published in American Journal of Physics v33 n8 p632-4 Aug 1965. Copies to DDC users only.

Descriptors: (*Crystal lattices, Geometry), Crystal structure, Ions, Symmetry (Crystallography)

An elementary method is described for enumerating near neighbors of an ion in a composite lattice where the ion positions are determined by symmetry. The method is illustrated by examples. (Author)

AD-626 865 Fld. 20/2
CFSTI Prices: HC $1.00 MF $0.50
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
GROWTH AND CHARACTERIZATION OF SINGLE CRYSTALS OF RARE EARTH COMPOUNDS.
Quarterly technical rept. no. 10.
1964, 6p. Contract AF49 (638)-1245

Unclassified report

Descriptors: (*Single crystals, Rare earth compounds), (*Rare earth compounds, Single crystals), Crystal growth, Magnetism, Gadolinium alloys, Neodymium alloys, Palladium alloys, Rhodium alloys, Iron alloys, Resistance (Electrical), Cryogenics, Aluminum alloys, Low-temperature research, Magnetic properties

Magnetization measurements were made on the GdNd alloys to ascertain the mode of the spin coupling between a heavy and a light rare earth atom. The magnetic data have substantiated the ferromagnetic spin coupling assumed in the Dekker theory of electrical resistivity of the rare earth alloys. It was further disclosed in a scientific paper that the Dekker theory is inapplicable to approximately half of the possible intra-rare earth alloys. Its failure reflects a lack of understanding of the light rare earth ions. A remedy of the theory necessitates a major change of the analysis basing on the actual energy-level structure of these ions, which is not known at the present time. Low-temperature resistivities were determined of several Pd alloys containing solute atoms of Gd, Rh, and Fe. The electrical data have reconfirmed the absence of the abnormally large spin-polarization effect of the localized moments of the Fe atoms in Pd. Experimental efforts were made to explore the possible occurrence of resistance minimum in the Pd-Gd alloys. The effect of local modes at the impurity centers was examined upon the scattering of electrons in aluminum between 4.2 and 300 K. (Author)

AD-626 867 Fld. 20/2, 20/13
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF PHYSICS
SURFACE THERMAL DIFFUSE SCATTERING FROM TUNGSTEN,
by Judith Aldag, and R. M. Stern. 15 Mar 65, 6p.
Contract AF49 (638)-1369 Proj. AF-9761
Task 976103
AFOSR 65-1992

Unclassified report

Availability: Published in Physical Review Letters v14 n21 p857-60 24 May 1965. Copies to DDC users only.

Descriptors: (*Tungsten, Thermal diffusion), (*Electron diffraction analysis, Tungsten), Surface properties, Diffraction, Phonons, Single crystals, Anisotropy, Thermal properties, Crystal lattices

An anisotropic diffuse background was observed, superimposed on the expected low-energy electron diffraction pattern from the clean (110) surface of a tungsten single crystal. The observations were made using a Varian system with 230- to 700-ev electrons over a temperature range of 300 to 1600K. No such structured background appears in X-ray diffraction patterns from tungsten. It was concluded that the observations were of thermal diffuse scattering from anisotropic surface modes and that this phenomena should be of value in investigating dispersion relationships for surface phonons. (Author)

AD-626 868 Fld. 20/2, 8/7, 7/2
POLYTECHNIC INST OF BROOKLYN N Y
POSITION AND THERMAL PARAMETERS OF OXYGEN ATOMS IN CALCITE,
by Henry Chessin, Walter C. Hamilton, and Ben Post. 25 Jun 64, 7p. Contract AF49 (638)-827
Proj. AF-9761 Task 976103
AFOSR 65-1989

Unclassified report

Prepared in cooperation with Brookhaven National Lab., Upton, N. Y.

Availability: Published in Acta Crystallographica v18 pt4 p689-93 4 Apr 1965. Copies to DDC users only.

Descriptors: (*Calcite, Crystal lattices), (*Oxygen, Thermal properties), Calcium compounds, Carbonates, Crystal structure, Chemical bonds

The position and thermal parameters of the oxygen atoms in calcium carbonate (calcite) at room temperature, 215K and 130K, have been determined. Reflections to which only oxygen atoms contribute were measured by counter methods. Parameters were refined by leastsquares methods. The C-O bond length is 1.283=0.002 at room temperature and does not change significantly between room temperature and 130K. (Author)

AD-627 148 Fld. 20/2, 20/5
CFSTI Prices: HC $2.00 MF $0.50
LINDE DIV UNION CARBIDE CORP INDIANAPOLIS IND
CZOCHRALSKI RUBY.
Semiannual technical summary rept. 1 Jul-31 Dec 65,
by F. R. Charvat, O. H. Nestor, and J. C. Smith.
26 Jan 66, 36p. Rept. no. SRCR-66-2
Contract Nonr-4132 (00) ,ARPA Order-306-62
Proj. NR-017-710

Unclassified report

See also AD-618 752.

Descriptors: (*Ruby, Crystal growth), (*Crystal growth, Ruby), (*Lasers, Ruby), Damage, Crystals, Defects (Materials), Particle size, Scattering

Overall objective of this program is to develop the Czochralski technique for the growth of large rubies of high optical quality, for laser use. Process has been scaled up to crystals 5/8 in. in diameter and 8 in. long, of similarly high quality as the smaller crystals growth previously. During high power active laser tests, internal crystal damage was observed. The damage was shown to originate at particulate scattering centers of the crucible material present in the crystal. By careful control of atmosphere above the melt, the scattering centers can be eliminated. (Author)

AD-627 149 Fld. 20/2, 20/5
CFSTI Prices: HC $1.00 MF $0.50
LINDE DIV UNION CARBIDE CORP INDIANAPOLIS IND
CZOCHRALSKI GROWTH OF LAALO3.
Semi-annual rept. 1 Jul-31 Dec 65,
by C. D. Brandle, H. M. Dess, and F. R. Charvat.
31 Jan 66, 18p. Rept. no. SRC-66-3
Contract Nonr-4793 (00) (A-1) ,ARPA Order-306

Unclassified report

See also AD-617 957.

Descriptors: (*Lanthanum compounds, Aluminates), (*Aluminates, Crystal growth), (*Crystal growth, Lanthanum compounds), (*Lasers, Materials), Laboratory equipment, Impurities, Doping, Chromium, Calcium, Silicon, Crystal structure, Color centers, Annealing, Twinning (Crystallography)

A new growth chamber was built to provide the capacity for growing boules capable of yielding 1/4-inch diameter by 3-inch length rods of Cr (3+) doped LaAlO3. Using this growth chamber, a seed rod of the correct orientation (111) was developed. Crystals containing Ca (2+) or Si (4+) were also grown to confirm the belief that they are the color center producing agents. As a result of these tests, additional color center producing agents were found, La (3+) lattice vacancies, and by proper annealing, these can be eliminated. Detwinning studies demonstrated the optimum direction to be the (111) direction of the pseudo-cube. Detwinning equipment was built which allows rods of either 1/8 or 1/4-inch diameter and up to 3-inches in length to be detwinned. (Author)

AD-627 171 Fld. 20/2, 11/6
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
MEASUREMENTS OF STACKING-FAULT PROBABILITIES IN BULK SPECIMENS.
Revised ed.,
by H. M. Otte, D. O. Welch, and G. F. Bolling.
23 Nov 62, 6p. Contract AF49 (638)-1029
Proj. AF-9761 Task 976102
AFOSR 65-1997

Unclassified report

Revision of manuscript submitted 18 Oct 62.

Availability: Published in Philosophical Magazine v8 n86 p345-6 Feb 1963. Copies to DDC users only. See also AD-282 054, AD-406 475.

Descriptors: (*Lead, Crystal lattice defects), (*Crystal lattice defects, Lead), Anisotropy, Strain (Mechanics), Stresses, X-ray diffraction analysis, Reflection, X-rays, Elasticity, Isotropism, Aluminum, Brass

In order to examine the effect in lead of the residual elastic strain on measurements of the stacking-fault probability alpha, alpha and the residual stress sigma are calculated from the equation delta DELTA2theta (sub p-q) = K (sub p-q) sigma + H (sub p-q) sigma and from measurements of the change in separation between two pairs of x-ray reflections. The usual assumption of zero residual strain gives values of alpha very close to those derived at the assumed extreme of isotropic strain. However, the stress values for both are found unreasonable. It is concluded that the contribution of the residual elastic strain is measurable in lead if the averaging assumption holds true and is quite significant if the extreme of isotropic stress holds true. It is advised in an experiment of this type to examine as many x-ray peaks as possible in order to take account of the contribution due to residual strains. (Author)

AD-627 174 Fld. 20/2, 20/12, 11/2
CFSTI Prices: HC $1.00 MF $0.50
STANFORD RESEARCH INST MENLO PARK CALIF
GROWTH AND CHARACTERIZATION OF BETASILICON CARBIDE SINGLE CRYSTALS.
Scientific rept. no. 2, Feb-Sep 65,
by Walter E. Nelson, Arne Rosengreen, and Frank A.Halden. Oct 65, 25p. Contract AF19 (628)-4190 Proj. AF-5621,SRI-FMU-5055 Task 562101
AFCRL 65-817

Unclassified report

Descriptors: (*Crystal growth, Carbides), (*Silicon compounds, Carbides), (*Single crystals, Carbides), (*Carbides, Single crystals), Semiconductors, Hall effect, Resistance (Electrical), Cryogenics, Temperature

Changes in crystal size and morphology were obtained by modifying the process for growing crystals of betasilicon carbide from solution in carbon-saturated melts. Well developed laths and plates were grown under conditions favoring dendritic growth mechanisms (low thermal gradient with moderate stirring). Polyhedral crystals grew under high thermal gradient conditions when high velocity stirring was employed. Three-dimensionaltype growth was also produced from a 73 wt percent ironsilicon alloy under conditions that normally produce lath-type growth. Uncorrected electron mobilities of 700 to 1000 sq cm/v-sec were measured at room temperature, and a few preliminary Hall measurements were made over the temperature range from 77 to 300 K. (Author)

AD-627 232 Fld. 20/2, 11/2
CFSTI Prices: HC $5.00 MF $1.00
RENSSELAER POLYTECHNIC INST TROY N Y
GROWTH TWINNING IN PEROVSKITE-TYPE CERAMICS.
Final rept.,
by Robert C. DeVries, Ernest F. Nippes, and Don B. Jugle. 31 Jan 66, 157p. Contract Nonr-591 (18)

Unclassified report

Descriptors: (*Twinning (Crystallography), Ceramic materials), (*Barium compounds, Titanates), (*Ceramic materials,Twinning (Crystallography)), Heat treatment, Crystal lattice defects, Crystal growth, Aging (Materials), Transition temperature, Microstructure, Electrical properties, Deformation, Grain boundaries, Quartz, Mica, Sandstone

Contents: structure-property relationships in itacolumite, deformation structures in batiO3 revealed as 180 degrees domains, the control of cubic (lll) twins in polycrystalline BaTiO3 and their effect on the electrical properties.

AD-626 729 See Fld. 20/12

AD-626 746 See Fld. 20/3

AD-626 754 See Fld. 20/12

AD-626 783 See Fld. 20/8

AD-626 799 See Fld. 20/6

AD-626 860 See Fld. 20/12

AD-626 869 See Fld. 11/6

AD-626 891 See Fld. 20/12

AD-626 895 See Fld. 11/6

AD-627 019 See Fld. 20/11

AD-627 223 See Fld. 7/2

20/3. ELECTRICITY AND MAGNETISM

AD-626 746 Fld. 20/3, 20/12, 20/2, 7/4
CFSTI Prices: HC $1.00 MF $0.50
PENNSYLVANIA UNIV PHILADELPHIA DEPT OF PHYSICS
ANNUAL SUMMARY REPORT,
by Herbert Callen. Dec 65, 6p. Contract Nonr-551 (36)

Unclassified report

See also AD-609 552, AD-611 064, AD-612 300, AD-612 472, AD-612 473, AD-618 038, AD-618 087, AD-624 719, AD-624 720.

Descriptors: (*Ferromagnetism, Theory), (*Antiferromagnetism, Theory), Nuclear spins, Spin, Phonons, Magnetostriction, Garnet, Electron spin resonance, Phase studies, Impurities, Ferromagnetic materials, Magnetism, Field theory, Green's function, Perturbation theory, Operators (Mathematics)

Work in progress on the following is summarized: Angular correlation of nuclear spins in ferromagnets; magnon-phonon coupling near the Curie temperature; spin impurities in antiferromagnets (AD-624 721); Wick's theorem and diagrammatic expansions for spin systems (AD-624 720). Listings are also given of the technical reports that were distributed and the publications that appeared during the year.

AD-626 883 Fld. 20/3, 20/12
LINCOLN LAB MASS INST OF TECH LEXINGTON
LONG-RANGE EXCHANGE INTERACTIONS FROM SPINWAVE RESONANCE,
by R. Weber, and P. E. Tannenwald. 20 May 65, 9p.

Unclassified report

Supported by U. S. Air Force.

Availability: Published in The Physical Review v140 n2A pA498-506 18 Oct 1965. Copies to DDC users only.

Descriptors: (*Magnetic resonance, Ferromagnetic materials), (*Ferromagnetic materials, Metal films), Iron alloys, Nickel alloys, Ferromagnetism, Magnetic properties, Spin, Field theory

The presence of the quartic term, in addition to the usual quadratic term, in the spin-wave dispersion relation has been established to within 3% accuracy by spin-wave resonance experiments in a number of Permalloy films. High-precision measurements at 70 Gc/sec permitted observation of spin wavelengths as short as 225 A. The coefficient of the quartic term, which involves the fourth moment of the exchange interaction, leads to a long-range interaction < rho-sq >=120 r-sq, where r is the nearestneighbor distance; this is in good

agreement with the range determined previously from spin-wave interaction measurements on a similar sample. Since the films are predominantly polycrystalline, anisotropy in the exchange could not be distinguished. < rho-sq > determined from the coefficient of the T to the 5/2 power term in the magnetization, measured by ferromagnetic resonance in the same type of sample, is smaller by a factor of about five. However, with such a long range, the validity of the usual expansion of the spin-wave energy to describe the magnetization is doubtful. (Author)

AD-626 901 Fld. 20/3, 9/2
CFSTI Prices: HC $2.00 MF $0.50
HARRY DIAMOND LABS WASHINGTON D C
FORTRAN IV PROGRAM FOR GAS TUBES AND OTHER DIELECTRICS,
by Edward R. Berman, and A. L. Ward. 5 Nov 65, 44p. Rept. no. TR-1310
Proj. DA-1C014501B11A ,HDL-98100
Unclassified report

Descriptors: (*Gas discharges, Programming (Computers)), (*Programming (Computers), Gas discharges), (*Discharge tubes, Programming (Computers)), Gas ionization, Ionic current, Electrons, Space charges, Electrical conductance, Gases, Solid state physics, Dielectrics, Nonlinear systems, Partial differential equations

A FORTRAN IV program describes the behavior of electron and ion currents in a gas discharge tube, including the effects of electronic and ionic space charges, by numerical integration of the relevant nonlinear partial differential equations. Provisions are made to allow valid calculations in the solid state. The program, designed for use on the IBM 7094 Operating System, is a rewriting and expansion of an earlier IBM 704 program formulated by Borsch-Supan and Oser in 1960. Discussion is related primarily to use of the program rather than to the physical or mathematical formulation of the problem or the numerical methods used. (Author)

AD-626 918 Fld. 20/3, 20/4
ILLINOIS UNIV URBANA
THEORY OF THE MOTION OF VORTICES IN SUPERCONDUCTORS,
by John Bardeen, and M. J. Stephen. 18 Jun 65, 11p. Contract DA-31-124-ARO (D)-114
AROD 431:69
Unclassified report

Availability: Published in The Physical Review, v140 n4A pA1197-207 15 Nov 1965.

Descriptors: (*Superconductors, Vortices), (*Vortices, Motion), Viscosity, Resistance (Electrical), Electric currents, Hall effect, Transport properties

The theory of the motion of vortex lines in the mixed state of type II superconductors is derived on the basis of local model that is a generalization of the London theory. It is believed the model simulates reasonably well the behavior of relatively pure superconductors, giving a vortex line with a normal core. It is found that if the force on a line is produced by a uniform transport current K, electric fields generated by the motion drive the current through the core, so that the total current flow is K + J (r-v t), where J (r) is the circulation of a stationary vortex and the v is the velocity of the line. In part K represents superfluid flow and in part normal flow. Expressions derived for the viscosity and flow resistivity are nearly identical with empirical laws of Kim and coworkers. The Hall angle expected in the mixed state is the same as in the normal state for a magnetic field equal to that in the core. (Author)

AD-627 004 Fld. 20/3, 9/1
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
MECHANICAL IMPULSE TRANSMITTED TO ELECTRODES IN ELECTRIC DISCHARGE BETWEEN BIMETALLIC ELECTRODES,
by I. G. Nekrashevich, and I. A. Bakuta. 6 Jan 66, 8p. Rept. no. FTD-TT-65-1001
TT 66-60348
Unclassified report

Trans. of Akademiya Nauk BSSR, Minsk. Vestsi. Seriay Fizika-Tekhnichnykh Navuk n2 p47-50 1964.

Descriptors: (*Electrodes, Erosion), (*Electric discharges, Electrodes), Electrolysis, USSR, Copper, Zinc, Tin, Bismuth, Physical properties, Mechanical waves, Deflection

An experimental study of the electroerosion effect on composite bimetallic electrodes indicated that this effect is governed by the physical properties of all metals participating in the erosion event. The areas of the erosion pits and the deflection of the ballistic pendulum, which is proportional to the impulse imparted to the electrode on discharge in liquid were measured. The results obtained are accounted for by the structure of the discharge channel within the framework of the migration theory proposed earlier by the authors. (Author)

AD-627 189 Fld. 20/3, 20/12
CFSTI Prices: HC $1.00 MF $0.50
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
ON THE ORIGIN OF PHASE TRANSITIONS IN VARIOUS MODELS.
Technical note,
by Gerard G. Emch. Jan 66, 20p. Rept. no. BN-433
Contract Nonr-595 (22)
Unclassified report

Descriptors: (*Phase studies, Superconductivity), (*Superconductivity, Phase studies), Field theory, Hamiltonian, Statistical mechanics, Electrons

A formal analogy is pointed out between the BardeenCooper-Schrieffer model for superconductivity and several variations of the model suggested by Kac for the exact study of phase transitions. It is shown that similar techniques (due to Haag) can be used in all these cases, and some conclusions are drawn on the origin of both equilibrium and non-equilibrium singularities. (Author)

AD-627 197 Fld. 20/3, 20/12
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
LOW-TEMPERATURE ANTIFERROMAGNETIC RESONANCE IN ALPHA FE203,
by S. Foner, and S. J. Williamson. 1964, 5p.
Contract AF49 (638)-1468 Proj. AF-9764 Task 496400
AFOSR 65-1984
Unclassified report

Availability: Published in Journal of Applied Physics v36 n3 pt2 p1154-6 Mar 1965.

Descriptors: (*Antiferromagnetism, Resonance), (*Iron compounds, Oxides), Low-temperature research, Single crystals

Antiferromagnetic resonance (AFMR) at 35, 70, and 121 Gc/sec in single-crystal synthetic and natural alpha Fe2O3 from 4.2 to 280K has been observed. The usual low-field AFMR as well as the spin-flop resonance mode are observed with pulsed magnetic fields applied parallel to the c axis. The data extend from well below the spin reorientation transition temperature T (about -10C) to well above T. The spin-flop mode joins smoothly with the canted high-frequency mode above T. The usual AFMR terminates abruptly at T. The three modes observed here for the first time in alpha Fe_2O_3 require either high fields or high frequencies or both for observation. The effects of the Dzyaloshinsky- Moriya field on the spin-flop resonance, the usual AFMR, as well as possible effects of spontaneous sublattice magnetizations are discussed. (Author)

AD-627 254 Fld. 20/3, 19/4, 20/4
CFSTI Prices: HC $3.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
ELECTROMAGNETIC RADIATION PRODUCED IN THE DETONATION OF INDUSTRIAL EXPLOSIVES,
by V. N. Zenin, and V. N. Mits. 1965, 58p.
Rept. no. Translation-2064-a
TT 66-60400
Unclassified report

Elektromagnitnoie Izluchenie Pri Vzryve Promyshkennykh vv, trans. of. Vzryvnoe Delo (USSR) n52/9 p115-29 1963.

Descriptors: (*Electromagnetic pulses, Explosion effects), (*Detonation waves, Electromagnetic properties), Explosive materials, Detonations, Electromagnetism, Gas ionization, Kinetic theory, Electromagnetic waves, USSR

The results of an investigation of the pulses of electromagnetic radiation arising from the detonation of the most characteristic industrial explosives. Indicate the following facts: (1) the emission of electromagnetic energy is connected essentially with the expansion of gaseous products of the detonation; (2) each explosive has a characteristic electromagnetic pulse, reproducible in parallel experiments; and (3) for different explosives these pulses differ markedly one from another.

AD-626 734 See Fld. 20/12
AD-626 799 See Fld. 20/6
AD-626 803 See Fld. 20/12
AD-626 822 See Fld. 20/6
AD-626 863 See Fld. 20/12
AD-626 864 See Fld. 20/12
AD-626 866 See Fld. 20/12
AD-626 887 See Fld. 20/6
AD-626 958 See Fld. 20/9
AD-627 081 See Fld. 11/6
AD-627 094 See Fld. 14/2
AD-627 097 See Fld. 20/1
AD-627 100 See Fld. 20/1
AD-627 200 See Fld. 20/12
AD-627 234 See Fld. 7/4

20/4. FLUID MECHANICS

AD-626 810 Fld. 20/4
GRADUATE AERONAUTICAL LABS CALIF INST OF TECH PASADENA
THEORY OF LAMINAR NEAR WAKE OF BLUNT BODIES IN HYPERSONIC FLOW.
Revised ed.,
by Barry L. Reeves, and Lester Lees. 7 May 65, 14p. Rept. no. GALCIT-Pub-617
Contract AF49 (638)-1298
Unclassified report

Presented as preprint 65-52 at the AIAA Aerospace Sciences Meeting (2nd), New York, N. Y., Jan 25-27 1965.

Availability: Published in AIAA Journal v3 n11 p2061-74 Nov 1965. Copies to DDC users only.

Descriptors: (*Laminar flow, Blunt bodies), (*Blunt bodies, Wake), Base flow, Stagnation point, Shock waves, Viscosity, Integrals, Differential equations, Enthalpy

The paper treats the problem of laminar flow in the near wake of blunt bodies. A theoretical model is employed which emphasizes two essential regions. In the first region, fluid is entrained by the shear layer from an irrotational external stream, and, simultaneously, fluid is scavenged by the shear layer from the recirculating viscous flow at the base. In the second region, which always commences upstream of the rear stagnation point, the turning of the flow in the inner viscous wake produces a strong viscous-inviscid interaction and generates a series of compression waves that eventually coalesce into a neck or wake shock. By means of this model, the near-wake solution is determined by a set of joining conditions for the two regions and also by a singular point in the neck which we show to be analogous to the critical point of the Crocco-Lees theory. The viscous interaction solution is obtained by means of a moment-integral method and follows the previous work by the authors on separated and reattaching laminar flows. Results of the present theory are in good agreement with the near-wake experiments of Dewey for adiabatic flow over a circular cylinder. (Author)

AD-626 917 Fld. 20/4, 20/13
MINNESOTA UNIV MINNEAPOLIS
TURBULENCE ENERGY PRINCIPLES FOR QUASINORMAL AND WIENER-HERMITE EXPANSIONS,
by William C. Meecham. 1965, 2p.
Unclassified report

Supported in part by ONR.

Availability: Published in Physics of Fluids v8 n9 np Sep 1965. Copies to DDC users only.

Descriptors: (*Turbulence, Energy), (*Series, Fluid flow), Partial differential equations, Approximation (Mathematics)

It has been shown that one formulation using a quasinormal assumption for turbulence equations leads to nonconservation of energy by the nonlinear transfer term. It is the purpose of this report to show that in a more symmetric formulation of the problem there is no such difficulty with the quasi-normal assumption.

AD-626 928 Fld. 20/4, 20/11
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-PATTERSON AFB OHIO
LOCAL AERODYNAMIC PARAMETERS FOR SUPERSONIC AND HYPERSONIC FLUTTER ANALYSES.
Rept. for 1 Jul 64-1 Apr 65,
by James J. Olsen. Oct 65, 50p. Rept. no. AFFDL-TR-65-183
Proj. AF-1370 Task 137003
Unclassified report

Descriptors: (*Flutter, Aerodynamic characteristics), (*Supersonic flow, Flutter), (*Hypersonic flow, Flutter), Panels (Structural), Mathematical analysis, Shock waves, Nose cones, Aerodynamic configurations

The report presents the results of an analysis to determine how certain aerodynamic flutter parameters are changed from their free stream values by the existence of supersonic and hypersonic nose shock waves and expansions. The results indicate that nose shock waves and expansions can create a new set of 'free stream' conditions for flutter analyses. These new free stream conditions can be sufficiently different from the undisturbed 'free stream' condition to warrant their detailed analyses in the supersonic and hypersonic vehicle. (Author)

AD-626 932 Fld. 20/4, 20/11
CFSTI Prices: HC $3.00 MF $0.75
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
SUPERSONIC WIND TUNNEL TESTS OF WAVYWALLED CYLINDERS.
Final rept. for Feb-Apr 64,
by William J. Anderson. Oct 65, 64p. Rept. no. ARL-65-203
Proj. AF-7063 Task 706302
Unclassified report

Descriptors: (*Cylindrical bodies, Flutter), (*Flutter, Aerodynamic characteristics), Model tests, Wind tunnels, Supersonic flow, Pressure, Boundary layer, Flow visualization, Schlieren photography

The primary objective of the experiment was to provide pressure measurements for use in flutter calculations. Wavy-walled cylinders were wind tunnel tested at Mach 3.0 and 4.62. The walls of the cylinders were rigid, with a sinusoidal deflection pattern machined in the outer surface. The waves extended in both the axial and circumferential direction. Flow was directed along the cylinder axis. Static pressures were measured at the wavy surface of each cylinder. The pressure perturbations proved to be smaller in amplitude than predicted by inviscid aerodynamic theories. The pressure distribution also had a small phase shift downstream. The tests are helpful in studying viscous flow effects on the pressures. A direct comparison with an existing idealized boundary layer theory was impossible, however, because of the choice of wave height on the model. Boundary layer separation occurred under some conditions. Separation was observed in the form of a small bubble lying behind a wave, particularly in regions where the boundary layer was laminar. Oil film studies were made by using a thin film of oil on the surface. When exposed to ultraviolet light, the oil film fluoresced, revealing the stream line pattern. Photographs of the oil film patterns and a number of Schlieren pictures are presented. (Author)

AD-626 951 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
SYMPOSIUM ON FLUID MECHANICS,
by Li Yu-Ch'ang. 6 Jan 66, 5p. Rept. no. FTD-TT-65-691
TT 66-60309
Unclassified report

Edited trans. of K'o Hsueh T'ung Pao (Chinese People's Republic), n3 p273 1964.

Descriptors: (*Fluid mechanics, Symposia), Hydrodynamics, Aerodynamics, Multiphase flow, China

A brief summary is given of topics presented at the symposium which was held in Shanghai in October, 1963.

AD-626 968 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
THE METHOD OF TRANSVERSE APPROXIMATION IN A HYPERSONIC FLOW,
by I. I. Aleksenko, R. G. Barantsev, and I. N. Panteleeva. 6 Jan 66, 34p. Rept. no. FTD-TT-65-1806
TT 66-60338
Unclassified report

Unedited rough draft trans. of Leningrad Univ. Vestnik (USSR) v17 n19 Seriya Matematiki, Mekhaniki i Astronomii n4 p62-78 1962.

Descriptors: (*Hypersonic flow, Approximation (Mathematics)), Series, Blunt bodies, USSR, Shock waves

The direct problem of hypersonic flow about blunt-nose bodies is solved by the method of apriori Ansatz of stream function dependence upon the transversal coordinate counted along the normal to the shock wave. The case of the linear approximation is considered in detail. (Author)

AD-626 973 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
THE EFFECT OF FLOW BOUNDARIES UPON CAVITY FLOW AROUND A CYLINDER,
by K. K. Shalnev. 11 Jan 66, 18p. Rept. no. FTD-TT-65-1813
TT 66-60343
Unclassified report

Unedited rough draft trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n3 p103-8 1965.

Descriptors: (*Cylindrical bodies, Fluid flow), (*Cavitation, Fluid dynamic properties), Pipes, Velocity, USSR, Mathematical analysis

The reduction of experimental data characterizing cavity flow-around of a cylinder in a straight working chamber of a hydrodynamic tube to conditions of flow-around by a flow of infinite width with the help of the equivalent velocity found from the equation of continuity can lead to errors in determining these parameters. The cause of these errors is that the increment of equivalent velocity along the profile of the model of a cylinder is nonuniform and, besides the effect of the flow boundaries, it is also subjected to the effect of the stage of cavitation development, i.e., to changes in the form and dimensions of the cavitation zone depending upon the cavitation number. The true magnitude of the correction can be determined only as a result of a series of tests with different constriction of the flow by the models at identical Reynolds numbers and cavitation stages by the method of extrapolation. (Author)

AD-627 025 Fld. 20/4
CFSTI Prices: HC $3.00 MF $0.75
PENNSYLVANIA STATE UNIV UNIVERSITY PARK ORDNANCE RESEARCH LAB
THE LAMINAR BOUNDARY LAYER IN THE VICINITY OF A SUCTION SLOT.
Technical memo.,
by C. F. Holt. 1 Dec 65, 69p. Rept. no. ORL (PSU)TM-502.2421-12
Contract NOw-65-0123-d
Unclassified report

Descriptors: (*Suction slots, Laminar boundary layer), (*Laminar boundary layer, Control), (*Drag, Reduction), Stability, Analysis of variance, Fluid flow, Momentum, Thickness, Wind tunnels

The interest in suction as a means of controlling the growth of the laminar boundary layer has led to the investigation of the behavior of such a boundary layer in the vicinity of a discrete suction slot. In order to observe the effect of one such slot, detailed boundary layer profiles were measured at various stations upstream and downstream of a slot. The investigation was carried out for the three slot Reynolds numbers equal to 29, 186, and 366. At each Reynolds number slot widths of 1/16, 3/32, and 1/8 inch were tested. Variation in the displacement thickness, momentum thickness and a shape factor based on the ratio of these two parameters indicated that the slot affects a region from 20 to 30 times its own width and introduces substantial changes in the aforementioned variables. In the present tests suction created profiles after the slot with shape factors equal to or less than the asymptotic suction value. (Author)

AD-627 031 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS AERODYNAMIC LAB
SIMILITUDE FOR NORMAL SHOCK WAVES IN NONEQUILIBRIUM FLOWS.
Interim technical rept. no. 5,
by R. E. Thomas, D. Brooke, and S. L. Petrie.
Oct 65, 49p. Contract AF33 (657)-10416 Proj. AF-1426 ,RF-1580 Task 142604
AFFDL TR-65-91
Unclassified report

Descriptors: (*Shock waves, Nonequilibrium flow), (*Nonequilibrium flow, Shock waves), Physical properties, Vibration, Numerical analysis, Dissociation, Relaxation time

Similarity parameters are developed which govern the length of nonequilibrium zones behind normal shock waves. Non-equilibrium effects produced by both vibrational relaxation and dissociation are considered. The parameters can also account for arbitrary levels of free-stream vibrational energy or dissociation level. The validity of the parameters is examined using numerical computations of the properties of the non-equilibrium fields. These computations are made with the aid of experimentally based rate expressions. The parameters, when written in a form describing the variation of non-equilibrium zone length with Mach number, are shown to have acceptable accuracy. (Author)

AD-627 065 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
NAVAL ORDNANCE TEST STATION CHINA LAKE CALIF
SLENDER-AIRFOIL CAMBERLINES WITH POLYGONAL LIFT DISTRIBUTIONS.
Research rept.,
by M. L. Sturgeon. Jan 66, 28p. Rept. no. NOTS-TP-3970
Task RUTO-3E-000/216-1/R009-01-003
NAVWEPS 8999 Unclassified report

Descriptors: (*Airfoils, Camber), (*Camber, Geometric forms), Leading edge, Boundary value problems, Slender bodies, Lift, Distribution, Velocity, Mathematical analysis

Nondimensional equations are developed from slenderairfoil theory to determine the geometry and pressure characteristics of a mean line camber that will enable a thin lifting surface to develop an arbitrary, assigned, polygonally shaped lift distribution in two-dimensional inviscid flow. These equations are verified as being adequate for making design decisions. (Author)

AD-627 112 Fld. 20/4, 20/12, 20/13, 1/1
CFSTI Prices: HC $3.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
JOURNAL OF ENGINEERING PHYSICS (SELECTED ARTICLES),
3 Jan 66, 57p. Rept. no. FTD-TT-65-1257
TT 66-60371
Unclassified report

Unedited rough draft trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) v7 n12 p23-31, 60-5, 85-105 1964.

Descriptors: (*Physics, Engineering), (*Engineering, Physics), Semiconductors, Thermal conductivity, Solids, Surface temperature, Measurement, Errors, Thermocouples, Fluid mechanics, Liquids, Laminar flow, Shock waves, Supersonic flow, Conical bodies, Perturbation theory, Heating, Cooling, Heat transfer, Aerodynamics

Contents: Measurement of semiconductor thermal conductivity by a nonsteady probe method. Errors in the measurement of temperature at the surface of a solid by means of a thermocouple in the case of heating and cooling in accordance with an arbitrary law. The flow of a liquid in thin layers. Solution of the thermal-conductivity problem for a semiinfinite body in the case of a variable heat-transfer coefficient. Determination of linearized perturbation flows in the case of an airstream flowing past nonaxisymmetric conic bodies at great supersonic velocity.

AD-627 126 Fld. 20/4, 12/1
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
INVESTIGATION OF THE SYSTEM OF EQUATIONS OF THE LAMINARY BOUNDARY LAYER IN A COMPRESSIBLE GAS NEAR THE STAGNATION LINE,
by B. N. Reznikov, and Yu N. Smyslov. 3 Jan 66, 12p. Rept. no. FTD-TT-65-1773
TT 66-60379
Unclassified report

Unedited rough draft trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n3 p85-8 1965.

Descriptors: (*Laminar boundary layer, Compressible flow), (*Equations of motion, Laminar boundary layer), Integration, Boundary value problems, Stagnation point, Series, USSR

AD-627 156 Fld. 20/4
CORNELL UNIV ITHACA N Y
THE THEORY FOR AN OSCILLATING THIN AIRFOIL AS DERIVED FROM THE OSEEN EQUATIONS,
by S. F. Shen, and P. Crimi. 25 Nov 64, 25p.
Unclassified report

Prepared in cooperation with Cornell Aeronautical Lab., Inc., Buffalo, N. Y.

Availability: Published in Journal of Fluid Mechanics v23 pt3 p585-609 1965. Copies to DDC users only.

Descriptors: (*Airfoils, Aerodynamic characteristics), Oscillation, Potential theory, Vortices, Trailing edge, Lift, Moments

The classical potential solution for the flow about a thin airfoil in either steady or oscillatory motion requires application of the condition, postulated by Kutta, that the fluid velocity be finite at the trailing edge of the airfoil. The Kutta condition derives from the argument that viscous stresses will not allow a flow to turn about a sharp edge. Analytic verification of the validity of this condition, of particular interest in the unsteady case, has not previously been obtained. The problem is treated here by utilizing the Oseen formulation for viscous flow. The solution thus obtained approaches small-perturbation potential flow at a large distance from the airfoil and retains a qualitatively correct representation of the rotational flow near the airfoil. By simply assuming that the resultant force onthe airfoil is finite, it is shown that the Kutta condition must apply in the limit of vanishing viscosity. The first-order corrections, for large Reynolds number, to the lift and moment on an oscillating airfoil are explicitly determined. (Author)

AD-627 165 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
FELTMAN RESEARCH LABS PICATINNY ARSENAL DOVER N J
ON THE ANALOGY BETWEEN A CYLINDRICAL SHOCK AND THE HYPERSONIC FLOW OF GAS PAST A BODY.
Technical translation.
by V. P. Korobeinikov. Jan 66. 13p.
PA TT-3.60383
Unclassified report

Trans. of Problemy Matematiki i Teoretichnov Fiziki (USSR) n6 p45-9 1962.

Descriptors: (*Hypersonic flow, Shock waves), (*Shock waves, Hypersonic flow), One-dimensional flow, Entropy, Cylindrical bodies, USSR, Mathematical analysis, Velocity

Equations are presented expressing the law of conservation of energy and constant entropy in a gas particle for the case of one-dimensional motion of an ideal gas.

AD-627 184 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
VERMONT UNIV BURLINGTON
HIGH AMPLITUDE SOUND AS A PHYSICAL AGENT,
by Wesley L. Nyborg. 1965, 7p. Contract AF-AFOSR-62-63
AFOSR 65-2182
Unclassified report

Congres International d'Acoustique (5th), Liege 7-14 Sep 1965.

Descriptors: (*Sound, Fluid flow), (*Bubbles, Fluid flow), Vibration, Acoustics, Velocity, Oscillation

AD-627 262 Fld. 20/4, 20/9, 1/2
CFSTI Prices: HC $1.00 MF $0.50
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
ANNUAL REPORT, OCTOBER 1, 1964 TO SEPTEMBER 30, 1965.
Final rept.,
by J. M. Burgers, and S. I. Pai. 21 Oct 65, 10p.
Contract AF-AFOSR-141-65
AFOSR 65-2004
Unclassified report

Descriptors: (*Fluid mechanics, Scientific research), Plasma physics, Magnetohydrodynamics, Jet mixing flow, Temperature, Transport properties, Equations of Motion, Aeronautics

The objectives of the research carried out on 'Phenomena around High Speed Flow' are: (a) Investigation of properties of gas at high temperatures: (b) Study of the effects of these properties in high speed flow and of methods for taking acount of them in calculations referring to the motion of bodies through gases: (c) Investigation of problems of electro- and magnetogasdynamics and of other aspects of high speed flow. Topic (a) consists of determination of transport coefficients, both theoretically and experimentally. Topic (b) is concerned with the construction of the flow equations, including effects of chemical reaction, ionization and thermal radiation. Topic (c) studies various flow problems which are of interest in aerospace engineering such as heat transfer in reentry conditions, magnetic fields in the space between sun and earth and in the magnetosphere.

AD-626 703 See Fld. 13/10

AD-626 918 See Fld. 20/3

AD-626 940 See Fld. 14/2

AD-626 957 See Fld. 20/11

AD-626 967 See Fld. 20/13

AD-626 983 See Fld. 14/2

AD-627 242 See Fld. 20/6

AD-627 254 See Fld. 20/3

20/5. MASERS AND LASERS

AD-626 743 Fld. 20/5, 11/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN OPTICAL CO SOUTHBRIDGE MASS RESEARCH DIV
NEODYMIUM LASER GLASS IMPROVEMENT PROGRAM.
Quarterly status rept. no. 15.
by Richard F. Woodcock. 1965. 3p. Contract Nonr-3835 (00) ,ARPA Order 306-20
Unclassified report

See also AD-613 963.

Descriptors: (*Lasers, Glass), (*Neodymium compounds, Lasers), (*Glass, Neodymium compounds), Niodymium, Refractive index, Thermal properties, Measurement, Stresses, Optical properties

AD-626 749 Fld. 20/5
CFSTI Prices: HC $1.00 MF $0.50
SYRACUSE UNIV N Y DEPT OF PHYSICS
PROGRESS REPORT.
Rept. for 1 Oct-31 Dec 65.
31 Dec 65, 2p. Contract Nonr-669 (18)
Unclassified report

Descriptors: (*Masers, Scientific research), Paramagnetic resonance, Strontium compounds, Titanates, Cobalt compounds, Bromides, Crystals

In the study of potential maser materials in the millimeter region, the paramagnetic resonance spectrum of strontium titanate doped with iron is measured in the frequency range 32 to 37 kMc and 65 to 75 kMc at magnetic field strengths up to 26 Kilo Oersted. Various directions of the magnetic field with the crystalline axis are also measured. The work on the molecular beam maser is steadily progressing. The Fabry-Perot interferometer which will serve as the cavity for the maser has been built and tested for mechanical operation. Resonance experiments on CoBr2. 6H20 were carried out at 200 to 300 Mc at temperatures between 1.3 and 1.6K.

AD-626 775 Fld. 20/5
CFSTI Prices: HC $1.00 MF $0.50
RCA LABS DIV RADIO CORP OF AMERICA PRINCETON N J
ROOM TEMPERATURE LASER DIODES.
Quarterly rept. no. 1, 1 Jul-30 Sep 65,
by George C. Dousmanis, Aline Akselrad, and Herbert Nelson. Oct 65, 21p. Contract DA-28-043-AMC-01501 (E) Proj. DA-1P6-22001-A-056 Task 1P6-22001-A-056-03
ECOM 01501-1
Unclassified report

Descriptors: (*Lasers, Diodes (Semiconductor)), (*Diodes (Semiconductor), Lasers), Gallium compounds, Arsenides, Crystals, Epitaxial growth, Doping, Solid state physics, Injection, Optics

The performance of pulsed GaAs injection lasers has been studied at repetition rates as high as 30 kc/sec with 80-nsec-wide pulses. Peak power outputs of 10 watts are obtained with 40 A at low repetition rates (0.1 to 10 kc/sec). At 30 kc/sec the power output is 4.5 watts. These results apply to the conventional parallelepiped structure (junction width approx. 0.0075 cm and length 0.025 cm). The experimental results up to 30 kc/sec suggest power outputs of about 1 W at 100 kc/sec, despite some temperature rise with repetition rate indicated by approximate calculations on heating effects. A new 'line diode' structure is described which embodies a large area p-n junction but with a lasing region width of less than 0.0025 cm. An improved performance is expected at high repetion rates from these units. (Author)

AD-626 953 Fld. 20/5
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
RADIATION BEHAVIOR OF MOLECULES IN THE DETUNING CAVITY AND OSCILLATION PHENOMENA OF A DOUBLE-CAVITY MASER,
by Lee Tieh-cheng, and Fang Li-chih. 6 Jan 66, 13p. Rept. no. FTD-TT-65-888
TT 66-60311
Unclassified report

Edited trans. of Wu Li Hsueh Pao (Chinese People's Republic) v20 n8 p753-9 1964.

Descriptors: (*Masers, Cavity resonators), (*Cavity resonators, Masers), Quantum mechanics, Ammonia, Molecular properties, Oscillation, Frequency, Power, Molecular beams, Wave functions, China

A quantum-mechanical treatment is presented of the radiation behavior of molecules in the detuning cavity. The phenomenon that was discovered by Higa (Rev. Sci. Instr., 28, 1957, p. 726) in his experiment with a double-cavity maser is explained; namely, when the detuning frequency of the first cavity reaches a certain critical value, the amonia molecules in the second cavity suddenly break out into oscillation at the central frequency. A critical formula for the detuning that excites such sudden oscillation is obtained. The influence of the cooperation effect is also taken into consideration. Also qualitatively explained is the experiment performed by Strakhovskiy et al. (J. Exp. Theor. Phys., 42, 1962, p. 907) which relates the degree of detuning in first cavity with the radiative power of the molecules in second cavity. (Author)

AD-626 955 Fld. 20/5
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
EXPERIMENTS WITH GAS LASERS,
by N. I. Kaliteievsii, and A. N. Razumovskii. 3 Jan 66, 17p. Rept. no. FTD-TT-65-1060
TT 66-60313
Unclassified report

Unedited rough draft trans. of Leningrad Univ. Vestnik. Seriia Fiziki i Khimii (USSR) v19 n10 p40-6 1964.

Descriptors: (*Lasers, Gases), Mixtures, Helium, Neon, Discharge tubes, Gas discharges, Infrared radiation, USSR

This report explains experiments in the creation and investigation of a laser from an He-Ne mixture, generating in close infrared space (lambda = 1.15 micr) on one of the transitions between 2s and 2p neon levels.

AD-626 959 Fld. 20/5
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
STUDYING THE RADIATION SPECTRUM OF A RUBY LASER AND ITS RELATIONSHIP WITH RESONATOR PROPERTIES,
by F. A. Korolev, and S. M. Mamedzade. 13 Jan 66, 12p. Rept. no. FTD-TT-65-1312
TT 66-60329
Unclassified report

Unedited rough draft trans. of Moscow Univ. Vestnik. Seriya 3: Fizika i Astronomiya (USSR) n2 p35-9 1964.

Descriptors: (*Lasers, Ruby), Resonators, Optics, Resonant frequency, Oscillation, Optical equipment components, USSR

The complex Fabri-Pero standard (multiplex) in a wedge like and crossed regime was accepted for the investigation of resonant oscillation radiation types of a ruby laser at room temperature. The outer dielectric mirrors and the frontal edges of the ruby crystal constituted the complex resonator, in which various forms of oscillation originated, corresponded to various resonator components. The multiplexstandard, working in wedge shaped and crossed condition with various thicknesses of thrust rings, enabled to solve components of ultra-thin structure of the ruby laser spectrum with complex resonator. (Author)

AD-627 046 Fld. 20/5, 9/1, 20/6
CFSTI Prices: HC $2.00 MF $0.50
ITT INDUSTRIAL LABS FORT WAYNE IND
IMPROVED QUANTUM EFFICIENCY LASER DETECTORS.
Interim engineering rept.,
by K. R. Crowe, and J. L. Gumnick. 20 Jan 66, 33p. Rept. no. ITTIL-66-1002
Contract AF33 (615)-3082
Unclassified report

Descriptors: (*Photocathodes, Lasers), (*Lasers, Photocathodes), Quantum mechanics, Photoelectric effect, Light transmission, Optical materials, Solid state physics, Optics, Detectors

This report covers the theoretical and experimental work completed during the first 4 months of the contract. An equation was derived relating photoelectric response to the optical and solid-state properties of photoemitters. The analysis includes the influence of multiple reflections of light from the photocathode boundaries and shows interference enhanced photoresponse for certain values of wavelength of the incident radiation and photocathode thickness. Photoelectric response for light entering the photocathode from the vacuum interface is compared to the response for light entering the photocathode from the glass interface for S-1 and S-20 photocathodes. The yield is generally found to be higher for light entering the photocatode from the glass substrate. It is believed that the relative yields of the two cases is partially determined by multiple reflections within the photocatode. The measurements of photoelectric yield versus photocathode thickness and experimental problems relating to the measurements are discussed. Experiments to be conducted during the remaining month of the contract are outlined. (Author)

AD-627 084 Fld. 20/5, 9/1, 17/2
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
HIGH-POWER GALLIUM ARSENIDE LASER DIODES.
Technical rept.,
by L. Wandinger, and K. L. Klohn. Oct 65, 24p. Proj. DA-1P6-22001-A-056 Task 1P6-22001-A-056-03
ECOM 2629
Unclassified report

Descriptors: (*Lasers, Diodes (Semiconductor), (*Diodes (Semiconductor), Lasers), (*Gallium alloys, Arsenic alloys), Pulse communication systems, Pulse modulation, Infrared communication systems, Performance (Engineering)

The essential features in the design, development, and performance of GaAs p-n junction laser diodes with high output in the coherent beam for application in secure communication systems are discussed. After a brief review of device design principles, the technology of wafer preparation, diffusion of extremely planar p-n junctions and the formation of ohmic, low resistance, area contacts developed at this Command is presented. Measurement techniques to determine the performance characteristics of these lasers such as threshold current density, output power, external quantum efficiency, spectral distribution and linewidth of emitted radiation are discussed. Experimental units with a total average power output in the coherent beam of more than three watts corresponding to a quantum efficiency of 15 percent have been made. (Author)

AD-627 135 Fld. 20/5
LINCOLN LAB MASS INST OF TECH LEXINGTON
PHYSICS OF QUANTUM ELECTRONICS,
by Peter E. Tannenwald, Paul L. Kelley, and Benjamin Lax. 1965, 5p. Rept. no. JA-2629
Contract AF19 (628)-5167
ESD TDR-65-559
Unclassified report

Availability: Published in Physics Today p58-62 Sep 1965. Copies to DDC users only.

Descriptors: (*Masers, Symposia), (*Physics, Masers), Lasers, Materials, Semiconductors, Gases

A report is given on the conference on the physics of quantum electronics held in San Juan, Puerto Rico, in June 1965.

AD-627 233 Fld. 20/5, 7/5, 20/9
CFSTI Prices: HC $1.00 MF $0.50
UNITED AIRCRAFT CORP EAST HARTFORD CONN RESEARCH LABS
INVESTIGATION OF THE MECHANISMS ASSOCIATED WITH GAS BREAKDOWN UNDER INTENSE OPTICAL ILLUMINATION.
Semiannual rept., 1 Aug-31 Dec 65,
by Alan F. Haught, and David C. Smith. 28 Jan 66, 24p. Rept. no. UACRL-E920272-6
Contract Nonr-4696 (00) ,ARPA Order-306
Unclassified report

See also AD-619 825.

Descriptors: (*Gas ionization, Light), (*Lasers, Gas ionization), Beams (Electromagnetic), Helium group gases, Impurities, Plasma medium, Luminescence, Pressure, Argon, Neon

Studies were made of the breakdown threshold of mixtures of the inert gases to determine the effects of controlled impurity levels on the breakdown process. In these experiments it was found that at 50,000 mm Hg the breakdown threshold of a 1 per cent neon, 99 per cent argon gas mixture was lower than that for pure argon, even though at any given pressure the breakdown threshold of neon alone is greater than that for argon. Measurements of the pressure dependence of the breakdown threshold of the gas mixture show the importance of gas collisions in the development of breakdown at high pressures and suggest that radiation energy transport may be the diffusion-like loss reported earlier. To examine further the growth of the breakdown region, studies have been made of the expansion of the breakdown plasma using a high-speed image converter camera. These studies show an initial rapid growth of the luminosity region followed by a contraction and a slower reexpansion of the luminous plasma. Further studies of the expansion are being carried out to determine the role of radiation energy transport in the plasma growth. (Author)

AD-626 747 **See Fld. 7/4**

AD-626 754 **See Fld. 20/12**

AD-627 141 **See Fld. 9/5**

AD-627 148 **See Fld. 20/2**

AD-627 149 **See Fld. 20/2**

20/6. OPTICS

AD-626 662 Fld. 20/6, 7/4
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
THEORY OF SIDEBAND PRODUCTION IN SPECTROSCOPIC EXPERIMENTS,
by J. D. Macomber, and J. S. Waugh. 14 Jul 65, 4p. Contract DA-36-039-AMC-03200 (E)
Unclassified report

Availability: Published in The Physical Review v140 n5A pA1494-7 Nov 1965. Copies to DDC users only.

Descriptors: (*Spectroscopy, Sidebands), (*Nuclear magnetic resonance, Sidebands), (*Sidebands, Theory), Microwave spectroscopy, Dipole moments, Hamiltonian, Fourier analysis, Bessel functions

In many systems which are capable of coherent scattering of radiation, satellite lines appear at regular frequency intervals about the center (carrier) line in the spectrum. Well-known examples include the Zeeman sidebands in magnetic resonance spectra and the Stark sidebands employed in microwave spectroscopy. In this paper a theory developed by Karplus to describe the latter case is generalized to cover a wider range of phenomena. The results are discussed from the point of view of nuclear magnetic resonance. (Author)

AD-626 692 Fld. 20/6
CFSTI Prices: HC $1.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
PARTIALLY COHERENT DIFFRACTION BY A CIRCULAR APERTURE.
Research rept.,
by R. A. Shore. Aug 62, 13p. Rept. no. AFCRL-62-715
N63 13851
Unclassified report

Descriptors: (*Light, Diffraction), (*Diffraction, Light), Optics, Wave functions, Diffraction gratings

Diffraction patterns of a circular aperture illuminated by partially coherent light can be calculated for a variety of correlation functions and radially varying intensities. The calculation is facilitated by using a theorem, based on the Wolf formulation of coherent theory, that relates the Fraunhofer intensity of a quasimonochromatic spatially stationary source to the Fourier transform of the product of the source autocorrelation function and the normalized source mutual intensity. Curves are presented for the case of a circular aperture with uniform intensity and exponential correlation. (Author)

AD-626 799 Fld. 20/6, 20/2, 20/3
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF RESEARCH LABS
OPTICAL TRANSMISSION IN MULTIDOMAINED KH2P04: POLARIZATION SCATTERING,
by R. M. Hill, G. F. Herrmann, and S. K. Ichiki. 3 May 60, 6p.
Unclassified report

Availability: Published in Journal of Applied Physics v36 n11 p3672-7 Nov 1965. Copies to DDC users only.

Descriptors: (*Potassium compounds, Phosphates), (*Phosphates, Optical properties), Polarization, Wave transmission, Ferroelectric crystals, Refractive index, Crystal structure

When cooled below the ferroelectric Curie temperature, KH2PO4 assumes a layered structure of thin domains. Light incident nearly normal to a domain wall and polarized along a principal crystal direction is found to be strongly scattered into a forward wave with polarization perpendicular to that of the incident radiation. This scattering increases as the square of the angle of incidence and is strongly dependent on wavelength. The scattering into the perpendicular polarization is shown to result from the boundary conditions relating the normal waves on both sides of a domain wall, and the wavelength dependence arises from interference effects due to the large number of such walls traversed by the ray. Scattering coefficients for the transmitted and reflected waves are derived. The scattering into the transmitted wave with perpendicular polarization is found to be much larger, in general, than the scattering into the reflected waves. Qualitative and quantitative agreement with observation is obtained. The observed effect is related to a similar effect observed in light reflected from KC1O3 crystals which was first noticed and discussed by Stokes and Rayleigh. (Author)

AD-626 822 Fld. 20/6, 20/3, 17/8
CFSTI Prices: HC $1.00 MF $0.50
HOLMAN (JOHN F) CO INC WASHINGTON DC
STIMULATED ELECTRON EMISSION FROM GLASS SURFACE AT ROOM TEMPERATURE,
by Bodgan Sujak, and Tadeusz Lewowski. Dec 65, 8p. Contract DA-44-009-AMC-930 (T) Proj. DA-1-M-624-201-D-466
AERDL T-1812-65, TT66-60294
Unclassified report

Trans. of Roczniki Chemii (Poland) v31 p707-10 1957.

Descriptors: (*Electrons, Emissivity), (*Photoelectrons, Emissivity), (*Glass, Emissivity), Electric fields, Geiger counters, Surfaces, Gas discharges, Quartz, Deformation, Color centers, Vision, Adaptation (Physiology), Optical equipment, Poland

Under the influence of the external electric field of an open atmospheric Geiger counter, an induced emission of electrons by glass was observed after abrading the surface. Emission from a glass surface could be induced also by a gaseous discharge of a small Tesla coil into air atmosphere. Slight emission could be observed in darkness during a few minutes. Abraded glass surfaces showed also an emission of photoelectrons under blue light illumination. Preliminary observations show that the induced emission may also occur from a quartz glass surface. The induced emission observed indicates the possibility of producing F-centers or centers like them as defects in the deformed glass surface. (Author)

AD-626 844 Fld. 20/6, 9/2
CFSTI Prices: HC $1.00 MF $0.50
INSTITUTE OF OPTICS UNIV OF ROCHESTER N Y
OPTICAL LENS SYSTEMS DESIGN FORMULAE FOR HIGH SPEED COMPUTERS.
Quarterly status rept. no. 7,
by Robert E. Hopkins. 30 Dec 65, 22p. Contract DA-30-069-AMC-534 (A)
Unclassified report

See also AD-623 392.

Descriptors: (*Lenses, Design), (*Optics industry, Data processing systems), (*Data processing systems, Optics industry), (*Programming (Computers), Optics industry), Optical materials, Machining, Control sequences, Computers

The following areas of work are to be covered: (1) Improve and extend the optical design features in ORDEALS, (2) study the effects of glass choice, with particular emphasis on secondary color, (3) study three and four element objectives in order to pin point regions of solution, and (4) refine a program which makes drawings of optical components as viewed from any desired vantage point. Image error groups are studied in order to determine a standard set of image errors which will be useful for general design. In the appendix of this report is a copy of the FLA1R program with its input format. (Author)

AD-626 887 Fld. 20/6, 20/3
LINCOLN LAB MASS INST OF TECH LEXINGTON
MAGNETO-OPTICAL SCATTERING FROM MULTILAYER MAGNETIC AND DIELECTRIC FILMS. PART II. APPLICATIONS OF THE GENERAL THEORY.
Revised ed.,
by D. O. Smith. 29 Apr 65, 12p.
Unclassified report

Revision of manuscript submitted 16 Nov 64.

Availability: Published in Optica Acta v12 n2 p193204 Apr 1965. Copies to DDC users only.

Descriptors: (*Magneto-optic effect, Films), (*Dielectric films, Magneto-optic effect), (*Magnetic materials, Magneto-optic effect), Scattering, Mirrors, Tensor analysis, Wave transmission, Impedance matching, Reflection, Polarized light

The general theory given in AD-622 307 is applied to discuss: (1) the maximum conversivity of a magnetic substrate and of thin-magnetic films on mirror substrates: (2) practical mirror and dualmode impedance-matching structures for use with a thin magnetic film: (3) the measurement of gyrotropic mu and epsilon tensors.

AD-626 907 Fld. 20/6, 20/9
MARYLAND UNIV COLLEGE PARK
MEASUREMENT OF STARK PROFILES OF SINGLY IONIZED NITROGEN LINES FROM A T-TUBE PLASMA,
by R. A. Day, and H. R. Griem. 30 Jun 65, 4p.
Unclassified report

Jointly supported by NSF, ONR and U. S. Air Force.

Availability: Published in The Physical Review v140 n4A pA1129-32 15 Nov 1965. Copies to DDC users only.

Descriptors: (*Stark effect, Plasma medium), (*Plasma medium, Nitrogen), Line spectrum, Electron density, Helium, Ionization, Shock tubes

A hot plasma composed of helium and ionized nitrogen was created by reflecting the shock wave produced in an electromagnetic T tube. The plasma temperature was measured by monitoring three nitrogen-ion lines whose intensities are strong functions of temperature. The profiles of various lines emitted in the plasma were obtained by scanning with a monochromator from shot to shot. The half-width of He I 3889 A was compared with empirically corrected calculations to determine the electron density. Half-widths of various nitrogen-ion lines were measured from the impact-broadened profiles; their shifts were obtained by comparing these profiles with unshifted lines from a pulsed capillary discharge. The results indicate agreement between experiment and recent Stark-broadening calculations with 20%, except for lines originating from the 4f level where Debye screening effects are important. No evidence was found for plasma polarization shifts. (Author)

AD-627 159 Fld. 20/6, 14/2, 14/5
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
OPTICS OF THE INTEGRATING SCHLIEREN INSTRUMENT,
by P. C. Y. de Boer. 29 Mar 65, 8p.
Unclassified report

See also AD-253 129.

Availability: Published in The Review of Scientific Instruments, v36 n8 p1135-42 Aug 1965. Copies to DDC users only.

Descriptors: (*Schlieren photography, Optical instruments), (*Optical instruments, Schlieren photography), Phototubes, Shock tubes, Refractive index, Light pulses, Diffraction, Density, Gases, Calibration, Shock waves, Optics

An analysis is presented of the optics encountered in the integrating schleiren arrangement as first described by Resler and Scheibe (J. Acoust. Soc. Am. 27:932, 1955). Expressions have been developed for the signal which will be received on the phototube, both for the instrumentation using an inclined knife edge and for that with a vertical knife edge. Attention is given to the conditions which must be satisfied to guarantee that the response of the phototube shall be proportional to the difference in refractive index at the beginning and the end of the test section. A simple method is described for calibrating the density scale: the method involves displacing the knife edge over a known distance and measuring the resulting signal. The influence of certain diffraction phenomena on the measurements is briefly discussed, and it is concluded that Fresnel diffraction occurring in the edges of the light beam is one of the factors determining the resolving power. Another factor important for the resolving power is the divergence of the incident light. In comparing the various possible positions of the knife edge, it is concluded that the inclined knife edge, besides allowing operation over a wide range of density gradients, has the advantage of giving a linearity of response which suffers little from diffraction effects. The advantage of the vertical knife edge is the very high sensitivity which can be obtained. (Author)

AD-627 242 Fld. 20/6, 20/4
CFSTI Prices: HC $3.00 MF $0.75
ELECTRONIC DEFENSE LABS SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF
RIPPLE TANK ANALOGS OF ELECTROMAGNETIC SCATTERING BY METALLIC AND DIELECTRIC CYLINDERS.
Technical memo.,
by James E. Burke, and Victor Twersky. 29 Oct 65, 69p. Rept. no. EDL-M810
Contract DA-28-043-AMC-00379 (E)
Unclassified report

Descriptors: (*Electromagnetic wave reflections, Analog systems), Water waves, Scattering, Cylindrical bodies, Metals, Dielectrics, Ellipsoids, Interference, Radar antennas, Mechanical waves, Vibrators (Mechanical), Water tanks

Because of their utility as 'analog computers' for studying the scattering of electromagnetic and acoustic waves, two ripple tanks were built up as part of the equipment used in the Laboratory's basic studies in scattering. These facilities are described in detail and data obtained with them are discussed. Results for two fundamental scatterers, elliptic and triangular dielectric cylinders, are emphasized. (Although the ellipse is a simple shape, and the corresponding perfectly conducting scatterer leads to a separable boundary value problem, the dielectric case is not separable in the usual sense. Similarly, the results for triangular cylinders model some aspects of the unsolved problem of scattering by a dielectric wedge.) Several analogs of scattering by metallic objects (cylinders, gratings, mirrors, etc.) are also considered in order to illustrate the overall utility of the ripple tanks for initial considerations of many practical propagation problems: the design of radar antennas, the analysis of interference patterns for complex arrays, the study of acoustic waves in bounded domains, ets. (Author)

AD-627 245 Fld. 20/6, 17/8
CFSTI Prices: HC $2.00 MF $0.50
SOUTHWEST RESEARCH INST SAN ANTONIO TEX
DUAL CHANNEL OPTICAL SYSTEM FOR USE WITH LOW VOLTAGE KERR CELL.
Final rept., 27 Apr-31 Dec 65,
by Frank C. Whitmore, Robert E. Linder, and William W. Bradshaw. 31 Dec 65, 43p. Contract AF41 (609)-2709
Unclassified report

Descriptors: (*Kerr cells, Optical equipment components), (*Flashblindness, Safety devices), (*Electrooptics, Kerr cells), (*Optical filters, Kerr cells), Polarizing filters, Optical materials, Liquids, Crystal structure, Light transmission, Clay minerals, Organic solvents

A working model of a dual channel window has been constructed which, when used in conjunction with a lowvoltage Kerr cell, should provide a useful flash blindness protection device. This first-phase program has demonstrated that a large area window structure using a dual-beam approach is feasible provided that an almost Brewster angle beam splitter arrangement is used with dual entrance windows. The resulting apparatus turns out to be too large to be applied to aircraft, but the size should not provide a serious limitation for such applications as ground vehicles. Some preliminary work is also reported which bears on the utility of thin layer liquid crystal systems for application as Brewster mirrors. (Author)

AD-626 734 See Fld. 20/12

AD-626 748 See Fld. 7/4

AD-626 808 See Fld. 7/4

AD-626 939 See Fld. 20/9

AD-626 958 See Fld. 20/9

AD-627 046 See Fld. 20/5

AD-627 234 See Fld. 7/4

20/7. PARTICLE ACCELERATORS

AD-626 909 See Fld. 20/8

AD-626 999 See Fld. 20/8

20/8. PARTICLE PHYSICS

AD-626 656 Fld. 20/8
CFSTI Prices: HC $3.00 MF $0.75
CALIFORNIA UNIV LOS ANGELES DEPT OF PHYSICS
ELASTIC SCATTERING OF 45 MEV PROTONS.
Technical rept.,
by Henry Willmes. Oct 65, 70p. Rept. no. TR-P-71
Contract Nonr-233 (44)
Unclassified report

Descriptors: (*Proton scattering, Elastic scattering), (*Elastic scattering, Differential cross section), Beryllium, Carbon, Nickel, Nuclear models, Nuclear structure, Nuclear reactions, Wave functions

Measurements of the differential elastic scattering cross section were carried out using the 'negative ion' beam of the UCLA cyclotron, as part of a program of optical model studies. The methods of data taking and of the reduction of the raw data are discussed in detail. Brief outlines of the history of the optical model of its mathematical formulation are included. Results of the cross section measurements are given for beryllium-9, carbon-12, nickel-58, and nickel-60 for a series of angles ranging from 15 to 150 degrees. (Author)

AD-626 681 Fld. 20/8
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
ELECTRIC MONOPOLE TRANSITIONS AND BETA BANDS IN EVEN NUCLEI,
by J. P. Davidson. 5 Nov 65, 32p. Rept. no. USNRDL-TR-926
Proj. SF-011-05-11 Task 0501
Unclassified report

Descriptors: (*Nuclei, Electric momements), (*Nuclear models, Deformation), Band spectrum, Gamma emission, Rare earth elements, Actinide series, Parity

Recent exact numerical calculations of the influence of deformation vibrations on electric quadrupole transitions in deformed even nuclei were extended to a study of electric monopole transitions in such nuclei. These monopole transitions can provide an insight into the nature of the excited O+ states, in particular into the excited K=O beta bands. Comparison with experiment shows that model predictions are adequate for the very

heaviest nuclei but are far too great for nuclei in the rare earth region. (Author)

AD-626 683 Fld. 20/8
CFSTI Prices: HC $2.00 MF $0.50
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
POSITIVE PION PRODUCTION ASYMMETRY WITH POLARIZED BREMSSTRAHLUNG NEAR SECOND RESONANCE,
by F. F. Liu, and S. Vitale. Nov 65. 31p. Rept. no. HEPL-393
Contract Nonr-225 (67)
Unclassified report

Descriptors: (*Photonuclear reactions, Meson scattering), (*Pions, Photonuclear reactions), Bremsstrahlung, Polarization, Gamma-proton reactions, Photons

The azimuthal asymmetry in pion (+) photoproduction by linearly polarized bremsstrahlung was measured at photon energies from 475 to 750 MeV at 90 and 135 degrees in the center of mass system. The experimental results show that even in this energy region pion (+) are predominantly produced in the plane of the magnetic vector. This is interpreted to mean that S and P wave amplitudes are predominating over the D wave amplitude. (Author)

AD-626 684 Fld. 20/8
CFSTI Prices: HC $1.00 MF $0.50
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
32S AND 31P EXCITATION BY 180 DEGREES ELECTRON SCATTERING,
by P. Kossanyi-Demay, and G. J. Vanpraet. Dec 65. 23p. Rept. no. HEPL-394
Contract Nonr-225 (67)
Unclassified report

Descriptors: (*Inelastic scattering, Electrons), (*Nuclear energy levels, Excitation), Differential cross section, Nuclear scattering, Sulfur, Phosphorus

The differential cross sections were measured for inelastic scattering of 50 MeV electrons at 180 degrees by 31P and 32S nuclei. Using the long wave length approximation, lower limits for radiation widths were derived for the levels. For 32S the giant dipole resonance was investigated, and the results are compared with a recent calculation of B. M. Spicer. (Author)

AD-626 744 Fld. 20/8
CFSTI Prices: HC $1.00 MF $0.50
CARNEGIE INST OF TECH PITTSBURGH PA DEPT OF PHYSICS
PHYSICS DEPARTMENT PROGRESS REPORT.
Rept. for 16 Jun 65-10 Jan 66.
by S. DeBenedetti. 10 Jan 66. 4p. Contract Nonr-760 (20) Proj. NR-018-304
Unclassified report

Descriptors: (*Mossbauer effect, Scientific research), (*Nuclear spins, Relaxation time), (*Relaxation time, Nuclear spin), Iodine, Aluminum compounds, Iron compounds, Ammonium compounds, Sulfates, Potassium compounds, Cyanides, Platinum

Research was conducted on the ratio of the ratios of nuclear radii in iodine: spin relaxation in diluted ferric alum: studies on potassium ferricyanide, with the intention to investigate the spin relaxation time in a low-spin ferric ion: and the Mossbauer effect in platinum. The Mossbauer spectrometer was converted to operate in the time made.

AD-626 779 Fld. 20/8
CALIFORNIA UNIV BERKELEY DEPT OF PHYSICS
PHASE OF THE CP-INVARIANCE VIOLATION IN TAU (O) DECAY,
by S. L. Glashow, and S. Weinberg. 13 Apr 65. 4p. Contract AF-AFOSR-232-63
AFOSR 65-1868
Unclassified report

Availability: Published in Physical Review Letters v14 n20 p835-6 17 May 1965. Copies to DDC users only.

Descriptors: (*Meson reactions, Decay schemes), (*Decay schemes, Invariance), K mesons, Pions, Nuclear particles

AD-626 780 Fld. 20/8, 3/2
BOSTON UNIV MASS DEPT OF PHYSICS
MACH'S PRINCIPLE, BARYON CONSERVATION AND BARYON MASS,
by P. Roman. 3 Nov 64. 17p. Contract AF-AFOSR-385-63 Proj. AF-9751 Task 975101
AFOSR 65-1871
Unclassified report

Availability: Published in Il Nuovo Cimento v37 (s10) p396-412 16 May 1965. Copies to DDC users only.

Descriptors: (*Baryons, Field theory), (*Field theory, Baryons), Relativity theory, Astrophysics, Gravity, Mass number, Equations of motion

Mach's principle is viewed as being incorporated into relativity by means of Dicke's scalar field theory. The assumption is made, however, that the scalar field interacts only with baryonic matter. Then it follows that the baryon current obeys an equation of continuity. Furthermore, by adopting the steady-state model of the Universe, the baryon mass becomes determined by the scalar field. Thus, both baryon conservation and the origin of the baryon mass can be regarded as a consequence of Mach's principle. In order to ensure the unrestricted validity of the equivalence principle, one must allow for a pressure in the matter fields. Various cosmological consequences are discussed. (Author)

AD-626 781 Fld. 20/8, 20/10
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
'ABNORMAL' QUANTUM NUMBERS AND DECAY CHANNELS; J (PG) ASSIGNMENT FOR EPSILON; A NORMAL SCALAR OCTET,
by David Loebbaka, and Jogesh C. Pati. 18 Mar 65. 7p. Contract AF-AFOSR-500-64 Proj. AF-9751 Task 975101
AFOSR 65-1872
Unclassified report

Availability: Published in Physical Review Letters v14 n22 p929-32 May 31 1965. Copies to DDC users only.

Descriptors: (*Decay schemes, Quantum mechanics), (*Nuclear resonance, Decay schemes), Meson scattering, Proton scattering, Pions, Nuclear spins

An indication of an enhancement at about 730 mev was shown recently in the recoil spectrum of the proton in pion (-) + p reactions (Bull. Am. Phys. Soc., v. 9: 629, 1964). There has been no indication of such an enhancement in a direct 2 or 3 pion invariant mass plot. An investigation is made of the existence of such a resonance, which does not decay with a large branching ratio to a 2 or 3 pion system, but can be observed in a recoil system and is produced with an appreciable cross section. The possible decay modes of the resonance are studied for different assignments of its quantum numbers. The order of magnitude of corresponding partial widths are estimated by assuming dominance of low mass intermediate states. Four possible quantum numbers are assigned, 0+-, 0-+, 0++, and 1++. (Author)

AD-626 782 Fld. 20/8, 20/10
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
SOLUTION OF THE KALLEN-PAULI EQUATION,
by Antonio Pagnamenta. 23 Nov 64. 11p. Contract AF-AFOSR-500-64 ,NSF-FP-3221 Proj. AF-9751 Task 975101
AFOSR 65-1873
Unclassified report

Availability: Published in Journal of Mathematical Physics v6 n6 p955-65 Jun 1965. Copies to DDC users only.

Descriptors: (*Integral equations, Elastic scattering), (*Elastic scattering, Field theory), Quantum mechanics, Nuclear shell models, V particles, K mesons

A relevant solution is given to the integral equation which Kallen and Pauli derived for elastic V thetascattering in the Lee model. As an application of this result the exact Tamm-Dancoff solution for the entire V theta-sector is obtained. This includes the amplitudes for V theta- and Nw theta elastic scattering and V thetaN2 theta production, as well as their extensions off the mass shell. (Author)

AD-626 783 Fld. 20/8, 20/2
CONNECTICUT UNIV STORRS DEPT OF PHYSICS
LARGE-ANGLE COLLISIONS IN AN ALUMINUM SURFACE BOMBARDED BY 50-KEV ARGON IONS.
Revised ed.,
by Poul Dahl, and John Magyar. 16 Jul 65. 9p.
Contract DA-ARO (D)-31-124-G685
AROD 2805:17
Unclassified report

Revision of manuscript submitted 16 Apr 65.

Availability: Published in The Physical Review v140 n4A pA1420-8 Nov 15 1965. Copies to DDC users only.

Descriptors: (*Ion bombardment, Aluminum), (*Aluminum, Surface properties), Argon, Ion beams, Inelastic scattering, Ions, Atoms, Crystal lattice defects

The ejection of charged atomic particles from the surface of an Al target during irradiation by 50-keV Ar (+) ions was studied. At several angles to the incident beam an analysis of emitted ions was performed by electrostatic deflection to a single-particle detector. The spectra show sharp peaks superimposed on a continuum. The peaks correspond to single collisions. From accurate measurements of peak positions, the inelastic energy loss in the Ar on Al collisions is obtained by methods assuming pure single collisions. The values are about 450 eV for the Al recoil peaks at angles from 77 to 50 degrees, and higher values (up to 600 eV) are found for more violent collisions. Variation of the angle which the surface forms to the incident beam did not influence the peak positions. This result supports the single-collision assumption. Absolute measurements of spectal intensities were also performed, and the number of target atoms per square cm that would account for the measured peak intensities was derived by applying generally accepted theoretical scattering cross sections. Typically, single-collision scattering is obtained from target atoms with density comparable to or less than the density in a (100) crystal plane. Theoretical estimates of multiple scattering are used in a discussion of the peak formation. (Author)

AD-626 786 Fld. 20/8
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF PHYSICS
SINGLE PARTICLE EXCHANGE IN 3 PARTICLE FINAL STATES OF THE REACTION POSITIVE-K P AT 2.26 BEV/C,
by F. Bomse, J. Cole, R. Zdanis, A. Pevsner, and I. Miller. 1964. 22p. Contract AF-AFOSR-234-63 Proj. AF-9751 Task 975101
AFOSR 65-1953
Unclassified report

Availability: Published in Physical Rev. Ltrs. v11 n90 p1-20, 1963. Copies to DDC users only.

Descriptors: (*K mesons, Nuclear reactions), (*Meson reactions, Probability), (*Proton reactions, Probability), Pions, Nucleons, Excitation, Resonance, Absorption, Mathematical models

Studies were made of the production differential cross sections and decay angular distributions of the K* and N* resonances produced in the reactions: positive-K, p to K*, p to neutral-K, positive -pion, p; positive-K, p to N*, neutral-K to neutral-K, positive-pion, p. The incident K meson laboratory momentum was 2.26 Bev/c. The spin-space density matrix elements of the K* and N* were calculated. They indicate a strong preference for vector meson exchange in the production of both resonances. The N* data is consistent also with the predictions of Stodolsky and Sakurai. Results of a study of the differential production cross sections incorporating absorptive effects in the Single Particle Exchange Model are also presented. (Author)

AD-626 811 Fld. 20/8
INSTITUTE OF THEORETICAL PHYSICS STANFORD UNIV CALIF
DEUTERON ELECTROMAGNETIC FORM FACTORS,
by M. Gourdin. 25 Jul 64, 9p. Contract AF49 (638)-1389 Proj. 9751 Task 975101
AFOSR 65-1867

Unclassified report

Availability: Published in Il Nuovo Cimento v35 (s10) p1105-13 16 Feb 1965. Copies to DDC users only.

Descriptors: (*Deuterons, Electromagnetic properties), Nucleons, Elastic scattering, Nuclear spins, Approximation (Mathematics)

The corrections to the deuteron electromagnetic form factors, due to movement of the spectator nucleon, are calculated in an impulse approximation for deuterons in their Breit system. (Author)

AD-626 812 Fld. 20/8
INSTITUTE OF THEORETICAL PHYSICS STANFORD UNIV CALIF
THE ETA MESON TO PION (+)PION (O)PION (-) DECAY WITH C-VIOLATION,
by M. Nauenberg. 26 May 65, 3p. Contract AF49 (638)-1389
AFOSR 65-1975

Unclassified report

Availability: Published in Physics Letters v17 n3 p329-31 15 Jul 1965. Copies to DDC users only.

Descriptors: (*Decay schemes, Meson reactions), (*Meson reactions, Decay schemes), Pions, K mesons

Calculations are presented for the effect of C violation on the eta decay spectrum. It is assumed that in addition to a delta I = 1 eta to 3 pion transition due to virtual electromagnetic interactions, there exists a delta I = 0 transition induced by the interaction H which violates C. The resultant pion (+)pion (-) asymmetry has very characteristic features due to the fact that the final I = 0, 3 pion state is antisymmetric under the exchange of any pair of pion momentum. Some details of a model for eta to 3 pion decay are discussed. The possibility that the C-violating interaction H violates isospin, and in particular that it allows an eta decay to the I = 2, 3 pion state is considered. (Author)

AD-626 813 Fld. 20/8, 20/10
INSTITUTE OF THEORETICAL PHYSICS STANFORD UNIV CALIF
BREAKDOWN OF UNITARY OCTET SYMMETRY IN A NONLINEAR SPINOR MODEL OF ELEMENTARYPARTICLE THEORY,
by N. Byrne, C. Iddings, and E. Shrauner. 8 Apr 65, 15p. Contract AF49 (638)-1389
AFOSR 65-1976

Unclassified report

Availability: Published in The Physical Review v139 n4B pB918-32 Aug 1965. Copies to DDC users only.

Descriptors: (*Elementary particles, Field theory), (*Field theory, Tensor analysis), Quantum mechanics, Nuclear reactions, Nuclear models, Nuclear spins, Mesons, Hyperons, Sigma hyperons, Baryons

We consider the spontaneous breakdown of unitary octet symmetry in a nonlinear spinor model of elementaryparticle theory. The model is an adaptation to unitary octet symmetry of a model originated by Nambu and JonaLasinio and contains SU3 X SU3 symmetry in the same way that their model contained SU2 X SU2 symmetry. We derive an exact formula for the physical baryon mass that reduces to the usual superconductor-type formula in the lowest order approximation. Nonperturbative solutions that leave the physical lambda hyperon and sigma hyperon masses degenerate are obtained. We confirm the presence in our nonperturbative solutions of massless pseudoscalar and scalar mesons transforming as components of F-type octets as predicted by the Goldstone theorem. We also find massless pseudoscalar and scalar mesons that transform as components of unitary spin decimets. We explain that only the F octets are Goldstone mesons associated with the spontaneous breakdown of octet symmetry in our model, whereas the massless decimets are associated with the invariance of a restricted part of our Lagrangian under a larger group and their masslessness is not a consequence of symmetry breakdown in our solutions. (Author)

AD-626 814 Fld. 20/8, 20/10
INSTITUTE OF THEORETICAL PHYSICS STANFORD UNIV CALIF
MESON STATES IN A NONLINEAR SPINOR MODEL OF ELEMENTARY-PARTICLE THEORY WITH SPONTANEOUS SYMMETRY BREAKDOWN,
by N. Byrne, C. Iddings, and E. Shraner. 8 Apr 65, 12p. Contract AF49 (638)-1389 Proj. AF-9751 Task 975101
AFOSR 65-1974

Unclassified report

See also AD-626 813.

Availability: Published in The Physical Review v139 n4B pB933-44 Aug 1965. Copies to DDC users only.

Descriptors: (*Elementary particles, Field theory), (*Field theory, Tensor analysis), Mesons, Groups (Mathematics), Nuclear models, Nuclear spins, Approximation (Mathematics)

We consider a self-coupled spinor model of elementary particles having SU2 X SU2 symmetry. We demonstrate that for the case of complete spontaneous breakdown of the isospin symmetry the bubble approximation gives a method for treating the meson states that is compatible with symmetries of the model in that it gives the Goldstone bosons and Goldberger-Treiman relations exactly. We also show that by a continuation in the parameter characterizing the isospin breakdown we can transform from a solution having isospin degeneracy to solution in which the isospin, as well as the chiral symmetry is spontaneously broken. Calculational technique for our approximation are explicitly given. (Author)

AD-626 824 Fld. 20/8
LYMAN LAB OF PHYSICS HARVARD UNIV CAMBRIDGE MASS
EFFECT OF GRAVITY ON GAMMA RADIATION,
by R. V. Pound, and J. L. Snider. 26 May 65, 17p. Contract Nonr-1866 (19) Proj. NR-024-012

Unclassified report

Availability: Published in The Physical Review v140 n3B pB788-803 Nov 8 1965. Copies to DDC users only.

Descriptors: (*Gamma rays, Gravity), (*Gravity, Gamma rays), Particle trajectories, Mossbauer effect, Radiation measurement systems, Geophysics

Recoil-free resonant absorption of the 14.4-keV gamma ray in Fe (57) has been employed to measure the effect of gravity over a 75-ft vertical path in the Jefferson Laboratory, in an improved version of the experiment of Pound and Rebka. A Co (57) source, initially 1.25 Ci, large-windowed proportional counters, and an enriched absorber foil 15 in. in diameter permitted a much increased counting rate. The employment of temperatureregulated ovens for source and absorbers and a redesigned monitor system to detect variations in waveform of the source velocity effected a reduction in systematic uncertainties. The result found was (0.9990=0.0076) times the value 4.905X10 to the minus 15th power of 2 gh/sq c predicted from the principle of equivalence. The range given here is the statistical standard deviation set by the number of counts involved. An estimated limit of systematic error is 0.010. (Author)

AD-626 827 Fld. 20/8
CAMBRIDGE UNIV (ENGLAND) DEPT OF APPLIED MATHEMATICS AND THEORETICAL PHYSICS
UNITARITY AND THE EVALUATION OF DISCONTINUITIES. III.
by D. I. Olive. 2 Dec 64, 25p. Contract AF-EOAR-79-63 Proj. AF-9751 Task 975101
AFOSR 65-1864

Unclassified report

Availability: Published in Il Nuovo Cimento v37 s10 p1422-45 Jun 16 1965. Copies to DDC users only.

Descriptors: (*Elementary particles, S-matrix), (*S-matrix, Nuclear reactions), Boundary value problems, Approximation (Mathematics)

A discussion is presented which summarizes some of the evidence of the S-matrix theory scheme of singularity structure. A study is presented of the normal threshold model or approximation in which the normal thresholds are the only singularities considered. The internal consistency of the model is investigated by studying a discontinuity scheme for the model, its various properties, and its relation to the physical unitarity relations and crossing. The workings of the multiparticle unitarity equations are shown in their role of evaluating the total discontinuity. (Author)

AD-626 876 Fld. 20/8
CALIFORNIA INST OF TECH PASADENA
EXCITED STATES OF LI6 OBSERVED THROUGH HE4 (D,D)HE4,
by L. S. Senhouse Jr., and T. A. Tombrello. 8 May 64, 20p. Contract Nonr-220 (47)

Unclassified report

Availability: Published in Nuclear Physics v57 n3 p624-42 1964. Copies to DDC users only.

Descriptors: (*Lithium, Nuclear energy levels), (*Elastic scattering, Deuterons), Deuteron reactions, Helium, Excitation, Phase shift, Polarization, Tensor analysis

Angular distributions (18 deg <0 < or = 156 deg) for the elastic scattering of deuterons from He4 have been obtained at 500 keV intervals for bombarding energies between 2.9 and 11.5 MeV. A phase shift analysis of these data has been made yielding confirming evidence for the existence of D wave, J = 2 (+) levels at excitation energies of

4.9 and 6.2 MeV, respectively. Single-level analyses of the P wave phase shifts indicate the possible presence of 2 (-), 1 (-) and 0 (-) levels at 6.8 and 9 MeV excitation energies. The moments of the tensor polarization of the scattered deuterons have been calculated and are compared to recent experimental results. The total reaction cross section is also calculated and is found to be in fair agreement with experiment. (Author)

AD-626 894 Fld. 20/8
CALIFORNIA UNIV BERKELEY DEPT OF PHYSICS
IS CHARGE-CONJUGATION INVARIANCE BADLY BROKEN,
by Sheldon L. Glashow, and Charles M. Sommerfield. 13 May 65, 5p. Contract Nonr-3656 (09), AF-AFOSR-232-63 Proj. AF-9751 Task 975101
AFOSR 65-1951
Unclassified report

Availability: Published in Physical Review Letters v15 n2 p78-80 12 Jul 1965. Copies to DDC users only.

Descriptors: (*Decay schemes, Meson reactions), (*Meson reactions, Decay schemes), Invariance, Nuclear reactions, Pions, K mesons, Mesons

Several simple C-nonconserving interactions are considered, any one of which could provide a mechanism for the decay K2 (o) to 2 pion. Present experimental data relating to C-nonconserving mesonic decay rates with phase-space estimates are compared. There is considerable suppression for C-nonconserving omega-pi-eta and phi-pi-eta coupling constants but no meaningful limit on the strength of the C-nonconserving coupling constants but no meaningful limit on the strength of the C-nonconserving rho-eta-pi coupling constant is obtained. It is shown that even if this coupling is strong, it would not produce a significant charge asymmetry in eta meson decay.

AD-626 896 Fld. 20/8
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF PHYSICS
EXPERIMENTAL DETERMINATION OF BRANCHING RATIOS OF VECTOR MESONS INTO LEPTON PAIRS,
by R. A. Zdanis, L. Madansky, R. W. Kraemerand, and S. Hertzbach. 17 Feb 65, 4p. Contract AF-AFOSR-234-63 Proj. AF-9751 Task 975101 AFOSR 65-1952
Unclassified report

Prepared in cooperation with Brookhaven National Lab., Upton, N. Y.

Availability: Published in Physical Review Letters v14 n17 p721-4 26 Apr 65. Copies to DDC users only.

Descriptors: (*Decay schemes, Meson reactions), (*Meson reactions, Leptons), Pair production, Muons, Electrons, Pions, Proton scattering, Monte Carlo method

The decay of neutral vector mesons (V (o) = rho, phi, omega) into leptons (l = muons or e) are studied in the reaction pion (-) + p to n + V (o) with subsequent decay V (o) to l (+) + l (-). The measured branching ratios in the present note are a factor of 10 lower than previously measured upper limits for electron decay. The experimental arrangement is described. A discussion is presented of the Monte Carlo generated, electron-pair events. (Author)

AD-626 909 Fld. 20/8, 20/7
GENERAL ATOMIC SAN DIEGO CALIF JOHN JAY HOPKINS LAB FOR PURE AND APPLIED SCIENCE
POSITRON YIELDS FROM A 45-MEV L-BAND ELECTRON LINEAR ACCELERATOR,
by R. E. Sund, R. B. Walton, N. J. Norris, and M. H. MacGregor. 16 Sep 63, 13p.
Unclassified report

Prepared in cooperation with High Voltage Engineering Corp., Walnut Creek, Calif., ARCO Div., and Lawrence Radiation Lab., Univ. of California, Livermore. Supported in part by ONR.

Availability: Published in Nuclear Instruments and Methods v27 p109-21 1964. Copies to DDC users only.

Descriptors: (*Positrons, Production), (*Electron accelerators, Linear accelerators), Pair production, Energy, Intensity, L band

The characteristics of a positron beam produced with a converter system located after the first section of a threesection, L-band accelerator were investigated. The number of positrons emerging from the accelerator per electron incident on the converter was determined as a function of electron bombarding energy over the range from 8 to 15 MeV. Other properties of the positron beam which were studied include the energy spectrum, the spot size, and electron contamination. The influence of the magnetic focussing fields on the positron yields was investigated, and the energy of the positrons leaving the converter which were preferentially accelerated was measured. Results of the yield measurements indicate that the present system, operating with an electron beam power of 4.5 kW on the converter, should yield an average positron beam current at the end of the accelerator of about 1.4 X 10 to the -9th power A within a 2 1/2% energy interval at 25 MeV. The energy of the positron beam can be varied continuously from several MeV to 33 MeV, and the current within a 2 1/2% energy bin is approximately proportional to positron energy. Calculations of positron yields and beam characteristics performed for electron bombarding energies of 9 MeV and 17 MeV gave results in good agreement with experimental observations. (Author)

AD-626 999 Fld. 20/8, 9/2, 20/7
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
A GENERAL ORBIT PROGRAM FOR SECTOR FOCUSED CYCLOTRONS,
by Lloyd Shaw. 23 Nov 65, 44p. Rept. no. USNRDL-TR-936
Proj. SF-011-05-11 Task 1601
Unclassified report

Descriptors: (*Particle trajectories, Programming (Computers)), (*Programming (Computers), Particle trajectories), (*Cyclotrons, Particle trajectories), Particle accelerator techniques, Ion accelerators, Ions, Equations of motion

A program for computer studies of general ion orbits in sector focused cyclotrons is described. The NRDL version of the General Orbit Code has evolved from the original Oak Ridge version of the program, but has been considerably modified for its application to the design of the NRDL 70-inch cyclotron. Several of the improvements to the original version of the code are discussed, including time dependent acceleration with four dee gaps in any harmonic mode. The general features of the code are described, such as tracing of orbits in the backward direction, simultaneous tracking of two orbits, and axial motion. A discussion of the input parameters and instructions for the operation of the program are included. (Author)

AD-627 026 Fld. 20/8, 7/5, 18/2
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
NUCLEAR-CHARGE DISTRIBUTIONS OF SEVERAL FISSION PRODUCT MASS CHAINS,
by Peter O. Strom, Daniel L. Love, Allan E. Greendale, Arnaldo A. Delucchi, and Daniel Sam. 5 Nov 65, 32p. Rept. no. USNRDL-TR-935
Contract AT (49-2)-1167
Unclassified report

Descriptors: (*Nuclear structure, Fission products), (*Fission, Radiochemistry), Charged particles, Distribution, Nuclear shell models, Mass number, Half life

New information on the nature of nuclear charge distribution in thermal neutron fission of 235U was obtained from measurements of fission yields of the major constituents in each of three adjacent mass chains. A regular variation in the width of the charge distribution curves with mass number was shown, and values of the most probable nuclear charge were determined. No effects attributable to the 50 proton or 82 neutron closed shells were observed in the charge distribution curves examined. Independent and cumulative fission yield values were determined for the several major constituents in each of the three mass chains 131, 132, and 133. The charge distribution curve for each mass chain was established from the fission yield data. Values of the most probable nuclear charge as given by the Gaussian curves for mass chains 131, 132 and 133 are, respectively: 50.72 plus or minus 0.07, 51.07 plus or minus 0.06, 51.59 plus or minus 0.04. Predicted effects of nuclear shells on charge distribution have been examined in light of the present data.

AD-627 027 Fld. 20/8, 7/5, 18/2
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
PD115 YIELD IN THERMAL NEUTRON FISSION OF U235,
by Herbert V. Weiss, and W. L. Reichert. 12 Nov 65, 12p. Rept. no. USNRDL-TR-943
Contract AT (49-2)-1167
Unclassified report

Descriptors: (*Fission, Uranium), (*Fission products, Palladium), (*Palladium, Fission products), Radiochemistry, Charged particles, Distribution, Nuclear structure, Half life, Decay schemes, Thermal neutrons, Isotope separation

The formation of Pd115 in thermal neutron fission of U235 was studied quantitatively. A procedure was developed which rapidly separated palladium from daughter elements silver and cadmium. Separations were made from 2.8-120 seconds after fission. The growth of Cd115 from palladium separated at various times constituted a decay curve for Pd115. The half-life thus determined was 40.5,-3.0 seconds, a value which agrees with that previously reported. The cumulative fractional yield of Pd115 compared to the total Cd115 yield was 90.5 = 7.2 %. Estimation of the most probable nuclear charge must await information on the contribution of other members to the yield of the 115 mass chain. (Author)

AD-627 067 Fld. 20/8, 20/12, 20/10
CFSTI Prices: HC $1.00 MF $0.50
UPPSALA UNIV (SWEDEN) QUANTUM CHEMISTRY GROUP
CRITERIA FOR THE BEST BOGOLIUBOV QUASI PARTICLE.
Scientific rept.,
by H. Kobe. 1 Mar 65, 8p. Rept. no. Scientific-39
Contract AF61 (052)-701 Proj. AF-7112
ARL 65-265
Unclassified report

Descriptors: (*Fermions, Superconductivity), (*Quantum mechanics, Fermions), Transformations (Mathematics), Perturbation theory, Atomic orbitals, Ground state, N-body problem, Sweden

The principle of compensation of dangerous diagrams has previously been the only general criterion for determining the coefficients in the Bogoliubov canonical transformation to quasiparticles. It is shown that the criterion of maximum overlap of the true ground state with the BCS ground state

gives the same condition for determining the coefficients. The criterion of diagonalizing the quadratic part of the reaction operator, which is a generalization of the BrillouinBrueckner condition, is also equivalent to the above criteria. Finally these criteria are evaluated from the standpoint of 'least labor for the most accuracy.' (Author)

AD-626 776 See Fld. 9/2

20/9. PLASMA PHYSICS

AD-626 880 Fld. 20/9, 22/3
LINCOLN LAB MASS INST OF TECH LEXINGTON
ELECTRON DENSITY DECAY IN WAKES.
Revised ed.,
by Wade M. Kornegay. 6 Jul 65, 5p.
Unclassified report

Supported by ARPA. Revision of manuscript submitted 20 Jan 65.

Availability: Published in AIAA Journal v3 n10 p1819-23 Oct 1965. Copies to DDC users only.

Descriptors: (*Electron density, Wake), (*Hypervelocity projectiles, Wake), Sabot projectiles, Spheres, Aluminum, Copper coatings, Ablation, Pressure, Reduction, Atmosphere entry, Simulation

The electron line density in the wakes of hypervelocity aluminum and copper spheres traveling 18,000 to 21,000 fps in air and in nitrogen was measured as a function of time using a transmission resonant cavity. The ambient pressure was varied over the range of 10 to 160 torr to determine its influence on the electron density decay. Typical results are given of measurements of the electron density in air and nitrogen. Results on the effect of ablated aluminum on the electron density decay are given. It is shown that electron decay data, which can be repeated from shot to shot without large discrepancies, are obtainable when the sabot is properly separated from the projectile, the gas impurity level is sufficiently low, and the projectile does not ablate. (Author)

AD-626 912 Fld. 20/9, 20/12
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF ELECTRICAL ENGINEERING
ABSOLUTE INSTABILITIES WITH DRIFTED HELICONS,
by Abraham Bers, and A. L. McWhorter. 6 Aug 65, 4p. Contract DA-36-039-AMC-03200 (E), NSF-GK-57
Unclassified report

Prepared in cooperation with Research Lab of Electronics, Mass. Inst. of Tech., Cambridge and Lincoln Lab., Mass. Inst. of Tech., Cambridge.

Availability: Published in Physical Review Letters v15 n19 p755-58 8 Nov 1965. Copies to DDC users only.

Descriptors: (*Plasma medium, Stability), (*Semiconductors, Plasma physics), Solid state physics, Carriers (Semiconductors)

Analytic results are reported for an exact computer analysis of helicon-wave instabilities in a drifted electronhole plasma.

AD-626 933 Fld. 20/9
CFSTI Prices: HC $1.00 MF $0.50
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
THE INITIATION OF A GLOW DISCHARGE,
by P. Bletzinger, H. E. Johnson, and A.Garscadden. Oct 65, 25p. Rept. no. ARL-65-201 Proj. AF-7073
Unclassified report

Descriptors: (*Glow discharges, Production), Stability, Spectroscopy, Photomultipliers, Plasma medium, Mercury, Argon, Plasma oscillations, Absorption

The initiation of a mercury-argon discharge was studied with emphasis on the establishment of the positive column. A high voltage, constant current power supply was switched by an electronic circuit which permitted independent control of the pulse length and of the pulse repetition frequency. The effects of the initial breakdown in the gas mixture were examined in detail using time resolved spectrographic techniques. After an initial period of approximately 1 millisec, the regular discharge features, (which under the experimental conditions included moving striations) started to appear. Image converter records showed that their initiation, in the form of a backward wave, was from the cathode, thus supporting the theory of Pekarek. It is concluded that in the study of decaying plasmas the assumption of initial spatial homogeneity is not always valid, and the position and degree of inhomogeneity will usually be a strong function of the initial conditions. (Author)

AD-626 938 Fld. 20/9
CFSTI Prices: HC $4.00 MF $0.75
TEXAS UNIV AUSTIN
TIME-SPACE RESOLUTION OF B-FIELDS IN THETAPINCH PLASMA BY FARADAY ROTATION OF INFRARED MASER RADIATION.
Technical rept.,
by John P. Craig, Robert F. Gribble, and Arwin A. Dougal. Jun 65, 122p. Contract AF 33 (657)-11073 Proj. AF-7073 Task 707301
ARL 65-129
Unclassified report

Descriptors: (*Magneto-optic effect, Plasma physics), (*Plasma physics, Probes), (*Probes, Plasma physics), Magnetic pinch, Deuterium, Plasma medium, Propagation, Infrared radiation, Masers, Interferometers

A method for experimentally determining the magnetic flux density B as a function of time and space in a dense, extreme temperature, highly dynamic, deuterium plasma was developed. The method employed the 3.39 u infrared radiation from a HeNe gas maser as a probe. The plasma electron density and the Faraday rotation of the plane of the polarization of the maser beam which propagated through the plasma were measured separately. These two measurements and the laws of propagation of electromagnetic waves in a magnetized plasma were used to deduce the magnetic field B in the plasma. (Author)

AD-626 939 Fld. 20/9, 20/6, 14/2
CFSTI Prices: HC $4.00 MF $1.00
TEXAS UNIV AUSTIN
INFRARED MASER INTERFEROMETRY FOR TIME AND SPACE RESOLUTION OF ELECTRON DENSITY IN HIGH TEMPERATURE PLASMAS.
Technical rept. no. 1,
by Robert F. Gribble, J. P. Craig, and Arwin A. Dougal. Jul 65, 132p. Contract AF33 (657)-11073 Proj. AF-7073 Task 707301
ARL 65-135
Unclassified report

See also AD-626 938.

Descriptors: (*Interferometers, Infrared equipment), (*Infrared equipment, Interferometers), (*Plasma physics, Probes), (*Probes, Plasma physics), Magnetic pinch, High-temperature research, Plasma medium, Electron density, Infrared radiation, Masers, Infrared optical systems

A 3.39 micron He-Ne maser excited infrared interferometer was utilized for the investigation of time and space resolved electron density in a high temperature, dense plasma formed in the theta - pinch geometry. Dispersion of the coherent infrared radiation by the plasma electrons within an external resonator pulls the frequency of the coupled maser resonator with a resultant change in intensity. The maximum measurable electron density time variation of 3 x 1016 cm-3 us-1 is achieved with a fast In As infrared detector, the resonators are operated with low coupling and at a relatively low Q. New diagnostic information on the magnetic compression of a Deuterium plasma is presented. (Author)

AD-626 958 Fld. 20/9, 20/6, 20/3
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
LIGHT SPARK IN A MAGNETIC FIELD,
by G. A. Askaryan, and M. S. Rabinovich. 3 Jan 66, 8p. Rept. no. FTD-TT-65-1311
TT 66-60328
Unclassified report

Unedited rough draft trans. of Zhurnal Eksperimentalnoi i Teoreticheskoi Fiziki (USSR) v1 n1 p9-15 1965.

Descriptors: (*Light, Sparks), (*Plasma medium, Sparks), Magnetic fields, Plasma oscillations, USSR

Results are described of an investigation of a spark in the presence of an outer magnetic field, which can be used in developing a plasma cluster of sparks by diamagnetic induction signals.

AD-627 007 Fld. 20/9, 14/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
INVESTIGATIONS OF THE ELECTRICAL AND OPTICAL PROPERTIES OF ARGON IN A STABILIZED ARC,
by A. E. Sheindlin, and E. I. Asinovskii. 21 Dec 65, 12p. Rept. no. FTD-TT-65-1236
TT 66-60351
Unclassified report

Unedited rough draft trans. of mono. Predstavlennyi Mezhdunarodnyi Simposium po Ionizatsionnym Yavleniyam v Gazakh (no. 6), Paris Jul 63 Doklad, n. p. 1963 10p.

Descriptors: (*Argon, Electric arcs), (*Plasma medium, Laboratory equipment), High temperature research, Optical properties, Electrical properties, Test methods, Line spectrum, USSR

The paper reports on the experimental setup developed at the Scientific Research Institute for High Temperatures at the MEI for high-temperature investigations of electrical conductivity, viscosity, thermal conductivity, and emissivity of gases at up to 10,00015,000K; it takes the form of an electric arc stabilized by cooled copper walls. The use of such arc chambers in the practical work of physics laboratories offers several advantages, for example, over shock tubes. In particular, it is important to be able to obtain thermodynamic plasma states fairly close to equilibrium for a fairly large current in the high-pressure arc, together with comparative simplicity in setting and adjusting the thermodynamic parameters for the state of the gas in the discharge.

AD-627 086 Fld. 20/9
CFSTI Prices: HC $5.00 MF $1.00
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
SOVIET RESEARCH IN PLASMA PHYSICS: COMPILATION OF ABSTRACTS,
by Frederick Pindy. 5 Oct 65, 197p. Rept. no. ATD-P-65-82 1
Task 40
TT 66-60366
Unclassified report

Rept. on Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Plasma physics, Abstracts), USSR, Stability, Plasma oscillations, Shock waves, Electromagnetic waves, Production, Astrophysics, Magnetohydrodynamics

Contents: Stability and oscillations, Shock waves, Electromagnetic fields, Diagnostics, Containment, Production and manipulation, Astrophysics, MHD, and Plasma waveguides.

AD-626 674 See Fld. 20/14

AD-626 907 See Fld. 20/6

AD-626 961 See Fld. 11/6

AD-626 972 See Fld. 21/3

AD-627 094 See Fld. 14/2

AD-627 233 See Fld. 20/5

AD-627 261 See Fld. 18/1

AD-627 262 See Fld. 20/4

20/10. QUANTUM THEORY

AD-626 787 Fld. 20/10
CFSTI Prices: HC $1.00 MF $0.50
QUEENS COLL OF THE CITY UNIV OF NEW YORK FLUSHING DEPT OF PHYSICS
TRIENNIAL CONFERENCE ON GENERAL RELATIVITY, GRAVITATION, AND ALLIED TOPICS HELD AT IMPERIAL COLLEGE, LONDON, U. K. JULY 1-9, 1965.
Technical rept.,
by A. L. Harvey. 1 Dec 65, 16p. Rept. no. TR-1
Contract Nonr (G)-00037-65
Unclassified report

Descriptors: (*Relativity theory, Symposia), (*Gravity, Symposia), Astrophysics, Elementary particles, Great Britain

The history of previous relativity conferences is discussed. Highlights of the 1965, London conference are given.

AD-626 877 Fld. 20/10
LINCOLN LAB MASS INST OF TECH LEXINGTON
THE BOHR-SOMMERFELD QUANTIZATION RULE AND THE WEYL CORRESPONDENCE,
by P. N. Argyres. 17 May 65, 10p.
Unclassified report

Availability: Published in Physics v2 n3 p131-9 1965. Copies to DDC users only.

Descriptors: (*Quantum mechanics, Operators (Mechanics)), Approximation (Mathematics), Hamiltonian, Wave functions, Harmonic generators

With the use of the Weyl correspondence between quantum mechanical operators and classical dynamical functions, an exact quantization rule is derived for a system with one degree of freedom and arbitrary Hamiltonian. In the semiclassical limit of small Planck's constant, this reduces to the Bohr-Sommerfeld quantization rule as derived by the WKB approximation. Higher order terms are also derived. It is further proven that for a simple harmonic oscillator the Bohr-Sommerfeld rule must give the exact energy eigenvalues for all states. (Author)

AD-626 781 See Fld. 20/8

AD-626 782 See Fld. 20/8

AD-626 813 See Fld. 20/8

AD-626 814 See Fld. 20/8

AD-626 936 See Fld. 7/4

AD-627 033 See Fld. 7/4

AD-627 059 See Fld. 20/12

AD-627 067 See Fld. 20/8

AD-627 222 See Fld. 7/2

20/11. SOLID MECHANICS

AD-626 691 Fld. 20/11
CFSTI Prices: HC $1.00 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE
INELASTIC EFFECTS IN RANDOM VIBRATION,
by Dean Karnopp. Oct 65, 22p. Contract AF49 (638)-1314
AFOSR 65-1915
Unclassified report

Descriptors: (*Vibration, Plasticity), Deformation, Strain (Mechanics), Yield point, Hysteresis

A procedure is given by which the vibration of systems containing inelastic elements which exhibit interface slippage or plastic yielding may be visualized and through which estimates of average amplitudes of vibrations as well as average rates of accumulation of plastic strain may be found. The method involves power balances and is most easily applied in the case of broad band excitation. The type of computations required are illustrated by means of a single degree of freedom example and two degree of freedom example systems are shown to illustrate the extension of the procedure to multi degree of freedom problems. (Author)

AD-626 737 Fld. 20/11, 21/8.2, 20/1
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
VIBRATIONS OF THICK-WALLED HOLLOW CYLINDERS EXACT NUMERICAL SOLUTIONS,
by J. F. Bird, R. W. Hart, and F. T. McClure.
Apr 60, 20p. Rept. no. TG-335-4
Contract NOrd-7386
Unclassified report

Descriptors: (*Cylindrical bodies, Vibration), Numerical analysis, Thickness, Boundary layer, Gases, Stresses, Oscillation, Attenuation, Rocket motors (Solid propellant), Acoustics

The plane strain vibration frequencies of an infinitely long hollow cylinder are calculated exactly with the aid of a high-speed electronic computer, for a range of wall thicknesses and azimuthal node numbers, and for a variety of boundary conditions. These latter cover the cases: outer radial surface free, or supported, or clamped; inner surface free, or supported, or matched to a gas filling the inner cavity. In the last case, we calculate the attenuation of sound in the cylinder wall, in addition to the eigenfrequencies. Our computations of mode frequencies disclose that: (i) the shear-compressional wave coupling in the solid is very weak (except for low frequency); (ii) for the gas-filled cylinder, the modes are very close either to the gas quasi-modes (gas in a rigid-walled cylinder), or to the solid quasi-modes (shell with free inner surface), depending on the geometry. (Author)

AD-626 738 Fld. 20/11, 21/8.2, 20/1
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
VIBRATIONS OF THICK-WALLED HOLLOW CYLINDERS: APPROXIMATE THEORY,
by J. F. Bird. Apr 60, 25p. Rept. no. TG-335-5
Contract NOrd-7386
Unclassified report

Descriptors: (*Cylindrical bodies, Vibration), Theory, Thickness, Boundary layer, Perturbation theory, Sound, Attenuation, Rocket motors (Solid propellant), Acoustics

An approximate theory (with sample calculations is presented) for the thickness eigenmodes of an infinitely long hollow cylinder of arbitrary wall thickness, and subject to a variety of boundary conditions. Beginning with the earlier observation (see AD-626 737) that the coupling between shear and compression waves in the solid wall is weak, a perturbation theory is deduced by which approximate eigenfrequencies can easily be computed by hand, with accuracy better than several percent provided the number of radial nodes is more than a few. The perturbation method can also be used to compute the attenuation of sound in the cylinder wall. (Author)

AD-626 750 Fld. 20/11
CFSTI Prices: HC $7.00 MF $1.50
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF
SELECTED PAPERS FROM A CONFERENCE ON 'STABILITY PROBLEMS IN STRUCTURAL MECHANICS',
by V. V. Bolotin, I. M. Rabinovich, and A. F. Smirnov. 1964, 306p.
TT 66-60281
Unclassified report

Trans. of mono. Problemy Ustoichivosti v Stroitelnom Mekhaniki, Moscow, 1965.

Descriptors: (*Structures, Stability), Symposia, USSR, Mechanics, Mechanical properties, Structural shells, Cylindrical bodies, Impact shock, Elastic shells, Loading (Mechanics), Elasticity, Plasticity

The report consists of 35 papers.

AD-626 862 Fld. 20/11, 22/3
CFSTI Prices: HC $3.00 MF $0.75
COLUMBIA UNIV NEW YORK DEPT OF CIVIL ENGINEERING AND ENGINEERING MECHANICS
DESIGN ESTIMATES OF STRESSES AND DEFORMATIONS IN MELTING PLATES.
Technical rept.,
by Edward Friedman, and Bruno A. Boley. Jun 65, 100p. Rept. no. TR-29 ,CU-29-65-ONR-4259 (07)CE
Contract Nonr-4259 (07) Proj. NR-064-401
Unclassified report

Descriptors: (*Ablation, Reentry vehicles), (*Reentry vehicles, Materials), Stresses, Deformation, Materials, Atmosphere entry, Aerodynamic heating, Design, Loading (Mechanics), Elasticity, Mathematical analysis

In order to provide calculation procedures and design estimates to determine the mechanical behavior of ablating plates subject to atmospheric reentry heating, the analysis of a melting elastic-perfectly plastic circular plate based on certain physically reasonable idealizations is considered. The plate, exposed on one face to a heat input which varies in time as a square pulse and insulated at the other face and at the edges, is acted upon by arbitrary edge loads. An approximate temperature solution, based on the extension of the penetration depth method to the melting problem, is derived and tabulated for all values of the parameters. A procedure is outlined for determining the stress distribution and deformations at all times during application of the pulse. Solutions are tabulated for certain cases in which the plate is not acted upon by edge loads. Approximate expressions are presented during the melting period to facilitate rapid design calculations. An analysis of stresses and deformations upon removal of the heat pulse is made based on the simplification of simultaneous elastic unloading throughout the plate at the time of removal of the pulse. (Author)

AD-626 927 Fld. 20/11
CFSTI Prices: HC $1.00 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD
RESIDUAL BORE STRESS IN AN AUTOFRETTAGED CYLINDER CONSTRUCTED OF A STRAIN HARDENING MATERIAL,
by Victor C. D. Dawson. 18 Dec 64. 20p. Rept. no. NOLTR-64-25 ,Ballistic Research-126
Proj. NOL-843/SP
Unclassified report

Descriptors: (*Cylindrical bodies. Stresses). Strain hardening. Strain (Mechanics). Deformation. Pressure. Steel. Experimental data. Theory

The calculation of the residual bore stresses in an autofrettaged cylinder is based upon a theory utilizing a perfectly plastic material. Nadai suggested a technique which would account for strain hardening of the material. The present report compares experimentally measured data for an autofrettaged cylinder. constructed of a strain hardening material. with this theory. (Author)

AD-626 957 Fld. 20/11, 20/4
CFSTI Prices: HC $2.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ACCURATE LINEARIZED THEORY OF SUPERSONIC FLUTTER PANELS: SET UP OF PROBLEM AND GENERAL SOLUTION,
by Dun Min-De. 3 Jan 66. 38p. Rept. no. FTD-TT-65-1192
TT 66-60327
Unclassified report

Unedited rough draft trans. of Scientia Sinica (Chinese People's Republic) v13 n3 p391-412 1964.

Descriptors: (*Panels (Structural). Flutter). (*Flutter. Supersonic flow). Linear systems. Equations. China. Oscillation. Hypersonic flow. Stability

The report represents an effort of systematically investigating the flutter movement of panels on the basis of linearized theory at supersonic flow around. The report consists of five parts: (1) arrangement of problem and general solution: (2) theorem of subsistence: (3) autooscillations in near and hypersonic flow: (4) stability of multispan: (5) autooscillations of trapezoidal plate with consideration of finite effect. (Author)

AD-626 986 Fld. 20/11, 11/6
CFSTI Prices: HC $4.00 MF $1.00
FIRESTONE FLIGHT SCIENCES LAB CALIF INST OF TECH PASADENA
THE THICKNESS EFFECT AND PLASTIC FLOW IN CRACKED PLATES.
Scientific rept. for Dec 60-Jun 64.
by Jerold L. Swedlow. Oct 65. 146p. Contract AF33(616)-7806 Proj. AF-7063 Task 706302
ARL 65-216
Unclassified report

Descriptors: (*Metal plates. Fracture (Mechanics)). (*Fracture (Mechanics). Metal plates). (*Titanium alloys. Fracture (Mechanics)). Thickness. Creep. Deformation. Stresses. Defects (Materials). Elasticity. Plasticity. Vanadium alloys. Chromium alloys. Aluminum alloys

In structure having high strength/weight ratios. the presence of material or mechanical imperfections can reduce the capability of the structure to perform as intended. Although large flaws can be detected and repaired. the possibility of smaller ones which might trigger fracture must be taken into account. Integrity of the overall structure therefore rests upon the ability to predict that size and geometry which can become critical when subjected to design stresses. (Author)

AD-627 019 Fld. 20/11, 11/6, 20/2
CFSTI Prices: HC $3.00 MF $0.75
MARTIN CO ORLANDO FLA MATERIALS RESEARCH LAB
EFFECTS OF SHOCK LOADING ON THE LATTICE OF A SILICON BRONZE WITH LOW STACKING FAULT ENERGY.
Technical rept..
by H. M. Otte. and J. Read Holland. Dec 65.
65p. Rept. no. OR-6899 ,TR-13
Contract Nonr-3706(00) Proj. NR-031-693
Unclassified report

Prepared in cooperation with Sandia Lab., Albuquerque. N. Mex.

Descriptors: (*Bronze. Impact shock). (*Crystal lattices. Loading (Mechanics)). (*Silicon alloys. Bronze). Shock (Mechanics). Impact tests. Crystal lattice defects. X-ray diffraction analysis. Hardness. Manganese alloys. Twinning (Crystallography). Electron microscopy. Shock waves

Effects of shock loading on the lattice of silicon bronze with low stacking fault energy were studied by postmortem analysis. Crystal imperfections introduced by shock loading up to 420 kbar were studied primarily by X-ray diffraction. Specimens were 30 mm long and 2 x 2 mm in cross-section: the shock pressure was applied to one of the 2 x 30 mm faces. By spinning the specimens at 200 rpm about the long axis. a DebyeScherrer geometry could be employed for the X-ray work. The macroscopic plastic strains determined from dimensional changes of the specimens varied linearly with shock pressure. whereas the slope of hardness versus pressure was initially steep and then asymptotically approached a limiting value. Analysis of the position and width of X-ray diffraction line profiles showed: (1) some formation of deformation stacking faults; (2) a decrease in domain size to a lower limiting value reached at fairly low (about 100 kbar) shock pressures; (3) essentially no rms strain in any of the specimens even after loading to maximum shock pressure. Observations are consistent with the formation. by shock loading. of micro-twins and faults as the principal lattice imperfections. In addition. evidence was found for a polymorphic transformation between 130 and 200 kbar. (Author)

AD-626 803 **See Fld. 20/12**

AD-626 836 **See Fld. 13/13**

AD-626 881 **See Fld. 13/13**

AD-626 895 **See Fld. 11/6**

AD-626 928 **See Fld. 20/4**

AD-626 929 **See Fld. 11/10**

AD-626 932 **See Fld. 20/4**

AD-626 988 **See Fld. 13/5**

AD-626 989 **See Fld. 13/5**

AD-627 048 **See Fld. 22/2**

AD-627 082 **See Fld. 13/13**

20/12. SOLID STATE PHYSICS

AD-626 670 Fld. 20/12, 7/4
MICROWAVE LAB STANFORD UNIV CALIF
OPTICAL LINEWIDTH AND LINE-SHAPE STUDIES OF ENERGY TRANSFER MECHANISMS BETWEEN RAREEARTH IMPURITY IONS,
by W. M. Yen. R. L. Greene. W. C. Scott. and D. L. Huber. 14 Jun 65. 10p. Rept. no. ML-1399
Contract Nonr-225(78)
Unclassified report
Availability: Published in The Physical Review v140 n4A pA1188-96 Nov 15 1965. Copies to DDC users only.

Descriptors: (*Crystal lattices. Impurities). (*Rare earth elements. Line spectrum). (*Promethium. Line spectrum). (*Neodymium. Line spectrum). Ions. Nuclear spins. Excitation. Electron transitions. Fourier analysis. Concentration (Chemistry). Atomic energy levels. Lanthanium compounds. Fluorides

Optical linewidth and line-shape studies are reported of transitions of 4f impurity ions in doubly doped systems and it is shown that interactions which involve excitation transfer between the impurity systems produce homogeneous broadening and line-shape changes in the optical transitions. In particular. studies were made of the behavior of the 5985-A line of Pr (3+) in doubly doped LaF3:Pr (3+), Nd (3+) as a function of Nd (3+) concentration. The 5985-A Pr (3+) transition at 4.2K involves two long-lived electronic states of the Pr (3+) ion: it follows that in the singly doped LaF3:Pr (3+) the transition shows a Gaussian shape which is characteristic of inhomogeneous strain and imperfection broadening. As Nd (3+) is added to the system. a broader Lorentzian component begins to appear in the 5985-A Pr (3+) transition and eventually completely dominates the width and shape of the transition. The Lorentzian component of the transition line shape was successfully separated using a Fourier-transform technique and the width of this component was studied as a function of the Nd (3+) concentration. The width is found to increase linearly with increasing Nd (3+) concentration up to concentrations of 2%: at higher concentrations. the linewidth saturates and approaches an asymptotic value of approx. 2/cm. (Author)

AD-626 729 Fld. 20/12, 20/2
CFSTI Prices: HC $4.00 MF $0.75
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
SILICON CARBIDE EPITAXIAL TECHNIQUES.
Scientific rept. no. 1. 1 Feb-31 Aug 65.
by Don M. Jackson Jr., and Bernard van Pul. 15 Oct 65. 127p. Contract AF19(628)-4802 Proj. AF4608 Task 460805
AFCRL 65-837
Unclassified report

Descriptors: (*Epitaxial growth. Semiconducting films). (*Semiconducting films. Epitaxial growth). (*Silicon compounds. Carbides). Silicon. Substrates. Vapor plating. Microstructure. Crystal structure. Doping. Electrical properties. Electron diffraction analysis. Electron microscopy. Propanes. Silanes. Chlorides

Epitaxial silicon carbide (SiC) films were grown on silicon (Si) by the simultaneous vapor phase deposition of silicon from silicon tetrachloride or silane and carbon from propane or isobutylene. The reaction temperatures were in the range of 1000 to 1300C (pyrometer). The resultant films were extensively examined by electron diffraction and transmission electron microscopy and found to be. for the most part. single crystal beta-SiC with some polycrystalline inclusions of the alpha SiC phase. Structurally. the films do not compare with high quality silicon or germanium. The <100> substrate orientation was found to be a better surface for the growth of beta-SiC than the (111) orientation. The optimum temperature range for film growth was found to be from 1000C to 1100C (pyrometer). Low energy electron diffraction studies were not conclusive due to difficulty met in annealing the films. Attempts at growing SiC p-n junctions were not successful. although rectifying junctions were fabricated using n-type films on p-type Si substrates. Most problems appear to be in the difficulty of obtaining definite p-type SiC layers. (Author)

AD-626 734 Fld. 20/12, 20/3, 20/6
CFSTI Prices: HC $1.00 MF $0.50
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS
HIGH PRESSURE RESEARCH.
Progress rept. no. 36 on High Pressure,
by Richard Zallen. Aug 65, 14p. Contract Nonr-1866 (10)

Unclassified report

Descriptors: (*High-pressure research, Semiconductors), (*Semiconductors, High-pressure research), (*Metals, High-pressure research), Optical properties, Electrical properties, Lead compounds, Tin, Reflectivity, Electron spin resonance, Transition elements, Oxides, Nickel compounds, Spectrum analyzers, Magneto-optic effect, Films, Germanium, Sulfides, Cadmium alloys, Mercury alloys, Tellurium alloys, Band theory of solids, Diodes (Semiconductor)

Work is summarized on the following topics: Optical and electrical properties of the lead salts under pressure: Electrical properties of gray tin as a function of pressure: Effect of pressure on reflectivity spectra: Spin resonance measurements on semiconductors: Properties of the transition metal oxides: Ratio type spectrometer for the measurement of small increments in absorption coefficients: Semiconducting properties of forsterite: Faraday rotation in semiconductors: Optical properties of semiconductor thin films: Band structure of gallium antimonide: Infrared shift of the emission of lead salt diodes with pressure.

AD-626 754 Fld. 20/12, 20/5, 13/8, 20/2
CFSTI Prices: HC $3.00 MF $0.50
MATERIALS RESEARCH CORP ORANGEBURG N Y
INVESTIGATION OF ELECTRON BEAM PROCESSING OF ALUMINUM OXIDE AND RELATED MATERIALS.
Interim scientific rept.,
by W. Class, Harvey R. Nesor, and G. T. Murray. 15 Dec 65, 57p. Rept. no. Scientific-3
Contract AF19 (628)-4089 Proj. AF-5621 Task 562101
AFCRL 65-908

Unclassified report

Descriptors: (*Lasers, Crystals), (*Ruby, Crystal growth), (*Sapphires, Crystal growth), (*Electron beams, Zone melting), (*Crystal growth, Zone melting), Aluminum compounds, Oxides, Processing, Doping, Plasma medium, Cathodes

This investigation deals with the application of floatzone techniques to the growth of laser ruby crystals. Two techniques, the electron beam and the hollow cathode float-zone processes, are being studied. The electron beam float-zone technique has yielded high perfection sapphire crystals free of visual scattering centers. Crystals grown by this technique show a preferred orientation of about 85 degrees as compared with flamefusion crystals which show a 60 degrees preferred orientation. Doping of the sapphire with Cr2O3 has been accomplished with the aid of oxide melting point depressants. The resulting ruby, however, still exhibits optical scattering. These centers can be attributed to starting material inhomogeneity. Efforts are presently underway to improve the starting material quality. The hollow cathode float-zone technique makes use of a highly localized hollow cathode plasma to produce a molten zone. This technique is currently being developed in an effort to carry out float-zone crystal growth at pressures higher than are permissible with the electron beam technique. The technique has been developed to the stage where floating zones have been produced and scanned. Large crystals have not yet been produced: further improvements in plasma stability must be accomplished before large crystals can be grown by this technique. (Author)

AD-626 755 Fld. 20/12
CFSTI Prices: HC $1.00 MF $0.50
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS
PROPERTIES OF SOLIDS AT LOW TEMPERATURES.
Quarterly rept. 1 Oct-31 Dec 65,
by D. O. Edwards. Jan 66, 3p. Rept. no. 26
Contract Nonr-495 (20) Proj. NR-018-412 .RF-989

Unclassified report

See also AD-624 824.

Descriptors: (*Solids, Low-temperature research), Research program administration, Solid state physics, Solidified gases, Hydrogen, Deuterium, Helium, Nuclear magnetic resonance, Magnetic properties, Superconductors, Alloys, Cryogenics

AD-626 803 Fld. 20/12, 20/11, 20/3
CHICAGO UNIV ILL DEPT OF PHYSICS
EFFECT OF UNIAXIAL COMPRESSION ON IMPURITY CONDUCTION IN P-GERMANIUM,
by Fred H. Pollak. 20 Nov 64, 16p. Contract AF-AFOSR-62-178 Proj. AF-9763 Task 976302
AFOSR 65-1924

Unclassified report

Availability: Published in The Physical Review, v138 n2A pA618-31 Apr 19 1965. Copies to DDC users only.

Descriptors: (*Germanium, Electrical conductance), (*Compressive properties, Germanium), (*Carriers (Semiconductors), Impurities), Stresses, Semiconductors, Band theory of solids, Doping, Gallium, Wave functions

The effect of uniaxial compression along (100) and (111) on impurity conduction was investigated in Ga-doped p-Ge. The experiments were performed between 300 and 1.2K. The largest stress applied was 6.8X10 to the 9th power dyn/cm sq. The analysis of the experimental results deals primarily with the high-stress region in which the two valence bands, which in the absence of stress are degenerate at k=0, are nearly decoupled so that the effect of the lower band on the acceptor wave function is treated as a perturbation. In the low-concentration region the extension of Miller and Abrahams' theory to include nonspherical charge distributions, together with the acceptor wave functions calculated from the effective-mass approximation, accounts for the observed stress dependence of the resistivity. At intermediate concentrations a linear relation between the impurity-conduction activation energy and the acceptor ionization energy is established. Although the experimental results are not able to distinguish between Mikoshiba's and Frood's theories of the activation energy process they are clearly in disagreement with the predictions of Mycielski's theory. The investigation of the stress dependence of the transition from nonmetallic to metallic conduction yields the stress dependence of the effective Bohr radius. (Author)

AD-626 829 Fld. 20/12, 9/1
CFSTI Prices: HC $2.00 MF $0.50
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
MICROWAVE OSCILLATIONS IN BULK SEMICONDUCTORS.
Quarterly progress rept. no. 1, 1 Jul-30 Sep 65,
by N. Braslau, J. M. Woodall, and T. S. Plaskett. Jan 66, 47p. Contract DA-28-043-AMC-01550 (E) Proj. DA-7900.21.243.38 .DEFENDER ECOM 01550-1

Unclassified report

Descriptors: (*Semiconductors, Solid state physics), (*Microwave oscillators, Semiconductor devices), Gallium alloys, Arsenic alloys, Heat treatment, Resistance (Electrical)

The state of development of Gunn effect devices as of the summer of 1965 is reviewed. N-type Gallium Arsenide with resistivity of 10-100 ohm cm has been obtained by the heat treatment of semi-insulating material and the results of preliminary investigation of this material are included. Attempts to make satisfactory ohmic contacts to this material have so far been unsuccessful. The results of several diagnostic experiments on Gunn effect oscillators made of this and lower resistivity materials are presented. (Author)

AD-626 860 Fld. 20/12, 20/2
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
SPIN-LATTICE RELAXATION OF ATOMIC HYDROGEN IN CAF2 INVOLVING LOCAL MODES,
by P. G. Klemens. 16 Dec 64, 4p. Contract AF49 (638)-1165 Proj. AF-9763 Task 976302
AFOSR 65-1994

Unclassified report

Availability: Published in The Physical Review v138 n4A pA1217-8 17 May 1965. Copies to DDC users only.

Descriptors: (*Crystal lattices, Relaxation time), (*Relaxation time, Nuclear spins), (*Hydrogen, Nuclear spins), Calcium compounds, Fluorides, Crystal structure, Phonons, Deuterium

The spin-lattice relaxation of atomic hydrogen and deuterium in CaF2 measured previously (Phys. Rev., v. 138: A1208, 1965) shows an exponential dependence, which is ascribed to a Raman process involving local modes. The magnitude of the pre-exponential factor can be compared to the ordinary Raman process for these centers, which was also observed. This ratio is compared with the predictions of the author's theory of spin-lattice relaxation involving local modes. It appears that the theory overestimates the effect of local modes on spin-lattice relaxation by a factor of order 5. This may arise from a comparable error in the theoretical estimate of the decay rate of a local mode by anharmonic processes, which enters the expression for the spin-lattice relaxation rate. Other possible sources of error are also discussed. (Author)

AD-626 863 Fld. 20/12, 20/3, 11/6
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
ELECTRICAL RESISTIVITY OF SOME GOLD ALLOYS: A SEARCH FOR EFFECTS DUE TO LOCAL MODES,
by D. H. Damon, and P. G. Klemens. 11 Jan 65, 7p. Contract AF49 (638)-1165 Proj. AF-9763 Task 976302
AFOSR 65-1993

Unclassified report

Availability: Published in The Physical Review v138 n5A pA1390-4 May 1965. Copies to DDC users only.

Descriptors: (*Gold alloys, Resistance (Electrical)), Impurities, Zinc alloys, Aluminum alloys, Copper alloys, Platinum alloys, Crystal lattices, Field theory, Wave functions, Elastic scattering, Electrons, Phonons, Brillouin zones

If phonon-assisted electron scattering by impurities contributes appreciably to the electrical resistivity of alloys, localized modes about light impurities should lead to a resistance which increases faster than linearly at temperatures around one-half the characteristic temperature of the local mode. The electrical resistivity of gold alloys containing 1.8 at-% Zn, 2.4 at-% Al and 2.6 at-% Cu was measured between 80 and 500 K. In these cases local modes are expected. Measurements were also made of alloys with 1.0 and 1.6 at-% Pt, where local modes should be absent. Substantial deviations from Matthiessen's rule were found, but not the temperature variation expected from local modes. It is suggested that this effect is obscured by deviations from Matthiessen's rule arising from the zone structure of gold. An unexplained discrepancy was found in the resistance of

the 1.6% Pt alloy. The resistivity of pure gold between 80 and 480K is tabulated in 20K steps (Author)

AD-626 864 Fld. 20/12, 20/3
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
SHIFT OF LANDAU LEVELS IN CROSSED ELECTRIC AND MAGNETIC FIELDS,
by Quirin H. F. Vrehen. 17 Feb 65, 7p. Contract AF49 (638)-1468 Proj. AF-9764 Task 976400
AFOSR 65-1988
Unclassified report

Availability: Published in Physical Review Letters v14 n14 p558-61 6 Apr 1965. Copies to DDC users only.

Descriptors: (*Band theory of solids, Germanium), (*Atomic energy levels, Perturbation theory), Electric fields, Magnetic fields, Semiconductors, Valence, Field theory

In mutually perpendicular strong electric and magnetic fields, a resonance is observed in the optical absorption below the direct-gap band edge in germanium. It is interpreted as the transition between the zeroth Landau levels in the valence and conduction bands. The variation of the position and intensity of this resonance with E/H is in good agreement with a theory of Aronov which treats the optical absorption in crossed fields in the effective-mass approximation. It is shown likely that the whole phenomenon of optical absorption below the gap in crossed fields in germanium can be reasonably described in the effective-mass approximation, up to the highest electric fields attainable. (Author)

AD-626 866 Fld. 20/12, 7/4, 20/3
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
MAGNETOABSORPTION OF THE INDIRECT TRANSITION IN GERMANIUM,
by John Halpern, and Benjamin Lax. 6 Nov 64, 10p. Contract AF49 (638)-1468 Proj. AF-9764 Task 976400
AFOSR 65-1991
Unclassified report

Availability: Published in The Journal of Physics and Chemistry of Solids v26 p911-9 1965. Copies to DDC users only.

Descriptors: (*Germanium, Magnetic properties), Electron transitions, Absorption spectrum, Cryogenics, Band theory of solids, Atomic energy levels, Magneto-optic effect

The indirect transition magnetoabsorption in germanium at 1.7K was studied in the Faraday configuration with the magnetic field perpendicular to the (100), (111) and (110) faces respectively and at fields of up to 74 kG. The main features in the Landau transition spectrum are due to transitions from the states at the top of the valence bands to the electronic ladders in the conduction band. The periodicities obtained in the spectra enabled us to determine the effective masses of the conduction band electrons; the values obtained are in good agreement with those determined from cyclotron resonance. A fine structure corresponding to the spacings of the ladders in the valence bands was observed superposed on the gross structure due to transitions to successive electronic levels; this fine structure was analyzed and a number of valence band levels were identified. Values of the free electron-g-factor were deduced and correlated with theory. (Author)

AD-626 891 Fld. 20/12, 11/6, 20/2
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION SYDNEY (AUSTRALIA) DIV OF PHYSICS
THERMAL EXPANSION AT LOW TEMPERATURES OF HEXAGONAL METALS: MG, ZN AND CD.
Revised ed.,
by R. D. McCammon, and G. K. White. 2 Dec 64, 12p. Contract AF-AFOSR-62-391 Proj. AF-9763 Task 976303
AFOSR 65-1927
Unclassified report

Revision of manuscript received 14 Oct 64.

Availability: Published in Philosophical Magazine v11 n114 p125-34 Jun 1965.

Descriptors: (*Magnesium, Thermal expansion), (*Zinc, Thermal expansion), (*Cadmium, Thermal expansion), (*Thermal expansion, Metals), Single crystals, Cryogenics, Experimental data, Crystal structure

Measurements were made between 2 and 30K of the linear thermal expansion of single crystals of Mg, Zn and Cd, both parallel and normal to the hexad axis. Values were obtained at liquid oxygen temperatures and at room temperature which agree with previous data. For Mg, the linear coefficient alpha normal to the hexad axis is larger than alpha parallel to the hexad axis below 30K, and at the lowest temperatures (< 10K) alpha parallel to the hexad axis = (0.9 sub 5 T +0.021T cubed) x 10 to the minus 9th power/K and alpha normal to the hexad axis = (1.2 sub 5T + 0.036T cubed) x 10 to the minus 9th power/K. the Gruneisen parameter, gamma, remains between 1.4 and 1.5. In zinc, alpha normal to the hexad axis is negative between 8 and 70K; alpha parallel to the hexad axis is always positive and increases very rapidly between 10 and 40K. Gamma has a value of 2.0 at room temperature and below 10K but has a maximum of about 2.8 at theta/15. For cadmium, alpha normal to the hexad axis is negative from 5 to 40K, but below this a positive term, assumed to be due to the electron gas, predominates; alpha parallel to the hexad axis varies with temperature much as in zinc. Gamma is about 2.3 at high and low temperatures and reaches a maximum of 3.4 at theta/15. (Author)

AD-626 892 Fld. 20/12, 20/13, 18/8
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION SYDNEY (AUSTRALIA) DIV OF PHYSICS
THERMAL CONDUCTIVITY AT LOW TEMPERATURE OF NEUTRON-IRRADIATED BEO,
by R. J. Tainsh, G. K. White, and A. W. Pryor. 1964, 19p. Contract AF-AFOSR-62-391 Proj. AF-9763 Task 976301
AFOSR 65-1928
Unclassified report

Prepared in cooperation with AAEC Research Establishment, Lucas Heights, Australia. Materials Div.

Availability: Published in Journal of Nuclear Materials v14 p208-19 1964. Copies to DDC users only.

Descriptors: (*Beryllium compounds, Oxides), (*Thermal conductivity, Beryllium compounds), (*Radiation damage, Crystal lattice defects), Neutron reactions, Low-temperature research, Heat transfer, Phonons, Annealing

Measurements are reported of the thermal conductivity of polycrystalline BeO in the temperature range 2 - 300 K. Samples were measured in the normal state and then after receiving fast neutron doses of 2.0 x 10 to the 18th power to 2.0 x 10 to the 20th power nvt. These measurements were undertaken in order to study the phonon scattering from radiation-induced defects. For the unirradiated material the scattering is adequately described by a combination of phonon interaction processes, grain-boundary scattering, and point scattering from impurities of unknown origin. For the irradiated material it is assumed that the defects consist predominantly of extensive planar clusters, which anneal in the temperature range 900 - 1100 C, and of a lower concentration of point defects which anneal below 600 C. The thermal resistance introduced by irradiation begins to saturate at doses of about 5.0 x 10 to the 19th power nvt owing to multiple scattering from the co-planar clusters. The measurements give an order-of-magnitude confirmation of earlier estimates of the defect concentration. (Author)

AD-626 941 Fld. 20/12, 10/1, 11/6
CFSTI Prices: HC $2.00 MF $0.50
GENERAL ELECTRIC RESEARCH LAB SCHENECTADY N Y
RESEARCH ON CDTE.
Final rept., May 61-May 65,
by R. E. Halsted, D. T. F. Marple, and B. Segall. Oct 65, 48p. Rept. no. 65-GC-0314G
Contract AF33 (616)-8264 Proj. 7885 Task 788503
ARL 65-205
Unclassified report

See also AD-610 801.

Descriptors: (*Cadmium alloys, Tellurium alloys), (*Tellurium alloys, Cadmium alloys), (*Semiconductors, Intermetallic compounds), Zone melting, Single crystals, Luminescence, Refractive index, Dielectric properties, Band theory of solids, Cryogenics, Doping, Absorption, Optical properties, Solar cells

The report summarizes results of the fourth year of a program of basic research on CdTe. The current status of our preparation of zone-refined single crystal material is reviewed. The results of three studies are presented; photoluminescence of defect-exciton complexes, a theoretical study of the absorption edge, and a measurement of the far-infrared refractive index and the static dielectric constant. Appended is a listing of 28 publications, 19 supported by the four-year study, and 9 facilitated by that study. (Author)

AD-627 003 Fld. 20/12
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS SOLID STATE SCIENCES LAB
A STUDY OF BAND EDGE DISTORTION IN HEAVILY DOPED GERMANIUM.
Physical sciences research papers,
by Freeman D. Shepherd,Jr.. Oct 65, 91p. Rept. no. PSRP-150
Proj. AF-5621 Task 562103
AFCRL 65-735
Unclassified report

Descriptors: (*Germanium, Band theory of solids), (*Tunnel diodes, Band theory of solids), (*Band theory of solids, Germanium), Electrical properties, Atomic energy levels, Cryogenics, Phonons, Tunneling (Electronics), Wave functions, Impurities, Doping, Crystal lattices, Semiconductors, Thermal properties, Brillouin zones

Details of the energy band structure of degenerate n-type germanium were determined by analysis of fine structure in the 4.2K volt-ampere characteristic of germanium tunnel diodes. No shift in the relative energy of the conduction band minima was observed. The band edge is found to be exponentially distributed with 1/e energies of the order of 10 MeV. There appears to be an ordering mechanism among the group V impurity atoms used as substrate dopants. (Author)

AD-627 018 Fld. 20/12
CFSTI Prices: HC $1.00 MF $0.50
MARTIN CO ORLANDO FLA MATERIALS RESEARCH LAB
INTERPRETATION OF ELECTRON DIFFRACTION PATTERNS FROM 'AMORPHOUS' BORON.
Technical rept.,
by Henry M. Otte, and Harry A. Lipsitt. Dec 65, 24p. Rept. no. OR-8000 ,TR-14
Contract Nonr-3706 (00) Proj. NR-031-693
Unclassified report

Descriptors: (*Boron, Electron diffraction analysis), (*Electron diffraction analysis, Boron), Glass, Electron microscopy, X-ray diffraction analysis, Crystal structure, Recrystallization

Samples of boron prepared by a vapour thermal decomposition process were examined in the electron microscope. Selected area diffraction patterns showed diffuse rings which could be indexed as FCC; in several instances a hexagonal array of spots was obtained. The latter appeared unchanged on tilting the specimen in the electron beam, but more accurate measurements revealed that the spots were displaced relative to each other. Samples that had been gently heated in the electron microscope until all the diffuse rings had disappeared gave rise only to spot patterns which showed, when the specimen was suitably oriented with respect to the beam, pronounced streaks that were continuous from spot to spot. All these observations can be interpreted, at least semiquantitatively in terms of a layer structure with extensive faults in the stacking sequence of the layers. The material as deposited has a very high density of stacking faults which are removed on heating, thereby converting the FCC cell of B12 groups into the rhombohedral structure of boron. (Author)

AD-627 059 Fld. 20/12, 7/4, 20/10
CFSTI Prices: HC $1.00 MF $0.50
UPPSALA UNIV (SWEDEN) QUANTUM CHEMISTRY GROUP
COMPUTATION OF THE COHESIVE ENERGY, THE LATTICE PARAMETER, AND THE COMPRESSIBILITY OF IONIC CRYSTALS BY USING RADIALLY DEFORMED ATOMIC ORBITALS. II. NUMERICAL APPLICATIONS TO LIF,
by Kauko Mansikka, and Fred Bystrand. 1 Jun 65, 17p. Rept. no. Scientific-43
Contract AF61 (052)-701 Proj. AF-7112
ARL 65-266

Unclassified report

See also AD-432 550.

Descriptors: (*Lithium compounds, Fluorides), (*Molecular association, Numerical analysis), (*Crystal lattices, Numerical analysis), (*Compressive properties, Crystals), (*Atomic orbitals, Crystals), Quantum mechanics, Wave functions, Ions, Field theory, Deformation, Nuclear spins, Sweden

The cohesive energy, the lattice parameter, and the compressibility of the static LiF crystal were determined in the Heitler-London scheme by means of three different quantum mechanical approximations. HartreeFock SCF-wave functions with exchange for Li (+) - and F (-) -ions were used for the computations. The values for the cohesive energy, the lattice parameter, and the compressibility obtained from different approximations agree well with corresponding experimental data. However, remarkable improvements are gained when using the deformation model of the ions. The virial theorem, a necessary condition for an exact wave function, is satisfied in the third approximation. The values of the scaling parameters indicate that in the crystal F (-) -ions are contracted and Li (+) -ions slightly extended as compared to the free ion states. The result is supported by the experimental measurements made on alkali halide crystals.

AD-627 066 Fld. 20/12
CFSTI Prices: HC $1.00 MF $0.50
ECOLE NORMALE SUPERIEURE PARIS (FRANCE) LABORATOIRE DE PHYSIQUE
OPTICAL SPECTROSCOPY OF SEMICONDUCTORS MATERIALS.
Annual summary rept. 1 Jan-31 Dec 64,
by M. Balkanski. 31 Dec 64, 6p. Contract AF61 (052)-789
AFCRL 65-325

Unclassified report

Descriptors: (*Semiconductors, Optical properties), (*Silicon, Semiconductors), Carriers (Semiconductors), Optics, Doping, Infrared spectroscopy, Crystal lattices, Solid state physics, France

Research is developed in the following areas: Transmission spectra near the band gap edge of highly doped and degenerate silicon; studies of the reflectivity on degenerate silicon in the far infrared region; and optical studies on the lattice dynamics of highly doped and compensated silicon.

AD-627 167 Fld. 20/12
CFSTI Prices: HC $3.00 MF $0.75
AROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
COMPOUND SEMICONDUCTORS: ANALYTICAL SURVEY.
Rept. no. 1 on ATD work assignment no. 79, task 30.
30 Dec 65, 73p. Rept. no. ATD-65-99
TT 66-60385

Unclassified report

Based on Soviet-bloc open source material for the period 1 Jul-31 Dec 63, and also material for 1 Jan-30 Jun 63 which was not included in rept. 2 of AID Work Assignment no. 41, Task no. 12.

Descriptors: (*Semiconductors, Reviews), Bibliographies, Scientific organizations, USSR

The analytical survey is based on Soviet-Satellite open sources published 1963-1964. It is the first report in this series and it consists of a Forward, an Analysis of Data for the entire year 1963, and an Annotated Bibliography with 139 entries. Section 1 of the bibliography (AIIIBV compounds) is comprised of 46 entries, Section 2 (AIIBVI compounds) of 70 entries, and Section 3 (AIVBIV compounds) of 3 entries. There are 3 appendixes: (1) Topic Tags Index; (2) Author Index; (3) Associations Index. The following compounds are covered: indium phosphide, indium antimonide, gallium antimonide, gallium arsenide, gallium phosphide, aluminum nitride, cadmium telluride, gallium nitride, indium nitride, boron phosphide, cadmium selenide, cadmium sulfide, mercury sulfide, zinc sulfide, zinc telluride, mercury telluride, and silicon carbide. According to the analyst the following trends have become apparent: (1) The number of studies made by noncentrally located scientific institutions has increased at the expense of the central institutes; (2) a certain specialization of research institutions is apparent; (3) new facilities are being developed. (Author)

AD-627 180 Fld. 20/12
CFSTI Prices: HC $2.00 MF $0.50
ILLINOIS UNIV URBANA DEPT OF PHYSICS
A STUDY OF IRON IMPURITY IN SILVER CHLORIDE USING MAINLY THE MOSSBAUER EFFECT,
by D. H. Lindley, and P. G. Debrunner. 1965, 43p. Contract Nonr-1834 (05) ,AT (11-1)-1198 COO 1198-330

Unclassified report

Descriptors: (*Single crystals, Impurities), (*Silver compounds, Chlorides), (*Iron, Mossbauer effect), (*Mossbauer effect, Iron), Cobalt, Radioactive isotopes, Temperature, Ionic current, Absorption spectrum, Electron spin resonance, Dielectric properties, Line spectrum, Chemical bonds, Crystal lattices

The Mossbauer effect was investigated as a function of temperature between 4K and 550K for sources of Cobalt-57 impurity diffused into single crystal silver chloride. Auxiliary measurements of ionic conductivity, optical absorption, E.S.R. and dielectric dispersion were also made. The Mossbauer spectrum of a freshly prepared sample is attributed to a ferrous ion in a substitutional site bound to a positive ion vacancy in a unique (100) position. Between 4K and 230K a simple quadrupole doublet is observed which is interpreted to show a measure of covalency in the ferrous ion. Above 230K the spectral lines broaden and the spectrum collapses to a single line; it is proposed that this effect is a result of the thermal motion of the vacancy around the impurity. The deduced vacancy jump times are shown to agree with those derived from dielectric dispersion measurements. Aged samples have complex Mossbauer spectra which are explained by the formation of additional centers of ferrous ions bound to anion impurities. (Author)

AD-627 196 Fld. 20/12, 20/13
CORNELL UNIV ITHACA N Y LAB OF ATOMIC AND SOLID STATE PHYSICS
LOW TEMPERATURE ELECTRONIC SPECIFIC HEAT OF SIMPLE METALS,
by N. W. Ashcroft, and J. W. Wilkins. 20 Jan 65, 5p. Contract AF49 (638)-402 Proj. AF-9761 Task 976103
AFOSR 65-1983

Unclassified report

Availability: Published in Physics Letters v14 n4 p285-7 15 Feb 1965.

Descriptors: (*Specific heat, Metals), (*Metals, Specific heat), Low-temperature research, Band theory of solids, Electrons, Phonons, Sodium, Aluminum, Lead

For the metals Na, Al, and Pb, the contributions to the low temperature electronic specific heat from band structure, electron-electron interactions, and electron-phonon interactions are calculated. The contributions due to band structure and electronelectron interactions are shown to be quite small: The contribution of electron-phonon interactions is shown to have a dominant effect on the low temperature electronic specific heat. (Author)

AD-627 200 Fld. 20/12, 20/3
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
MAGNETIC RESONANCE STUDIES OF THE CUBIC ANTIFERROMAGNET RBMNF3,
by M. J. Freiser, R. J. Joenk, P. E. Seiden, and D. T. Teaney. 1964, 7p. Contract AF49 (638)-1379 Proj. AF-9761 Task 976103
AFOSR 65-1985

Unclassified report

Availability: Published in Proceedings International Conference on Magnetism Nottingham England p432-6 7-11 Sep 1964. Copies to DDC users only.

Descriptors: (*Antiferromagnetism, Resonance), (*Nuclear magnetic resonance, Manganese), (*Manganese compounds, Rubidium compounds), (*Rubidium compounds, Fluorides), Magnetic resonance, Anisotropy, Cryogenics, Field theory, Molecules

The properties of the cubic antiferromagnet RbMnF3 are being studied by means of antiferromagnet resonance and 55Mn nuclear resonance. The possibility of observing non-linear interactions between the two antiferromagnetic resonance modes is discussed. The temperature variation of the anisotropy has been measured up to 77K. It has been found to agree within experimental error with Wolf's molecular field treatment of the dependence of K on M. The nuclear magnetic resonance measurements have been refined and extended to applied fields of 27 kOe yielding a value of the unpulled nuclear magnetic resonance frequency of 686.2 Mc/s. The half-width at half-maximum is independent of field at fields large enough to eliminate domain effects and is found to be 280 kc/s, about an order of magnitude less than the Suhl-Nakamura linewidth. An as yet unexplained anomaly occurs when the pulled nuclear frequency is 680 Mc/s. (Author)

AD-627 238 Fld. 20/12, 7/4
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA

THE ROLE OF POINT DEFECTS IN SOLID STATE REACTIONS.
by George J. Dienes, and Arthur C. Damask.
1964, 16p. Proj. 1C014501B11A
FA A64-33

Unclassified report

Prepared in cooperation with Brookhaven National Lab., Upton, N. Y.

Availability: Published in Reactivity of Solids International Symposium (5th) Munich p227-37 1964. Copies to DDC users only.

Descriptors: (*Crystal lattice defects, Chemical reactions), Diffusion, Reaction kinetics, Impurities, Chemical bonds, Chemical precipitation, Annealing, Kinetic theory

Lattice vacancies play a crucial role in solid state reactions because diffusion processes in a large class of solids are controlled by the concentration and mobility of vacancies. They take part in a variety of processes leading to phase changes, precipitation, order-disorder transformation and chemical reactions in solids. The kinetics of the migration of vacancies, their interactions with each other and with impurity atoms, can be described in terms of chemical rate theory. In metals there is often a positive binding energy between vacancies and impurity atoms. A derivation for vacancy-impurity complex concentration is given and estimates of binding energies are discussed. The effect of the binding of excess vacancies to impurity atoms on the kinetics of migration is investigated. It is shown that if a highly mobile impurity-vacancy complex is formed, then excess vacancies accelerate the segregation of impurities. Conversely, if the impurity-vacancy complex is relatively immobile, then the impurities retard the disappearance of the vacancies. Several important parameters such as the impurity-vacancy binding energy and the rate and amount of impurity segregation, can be derived from annealing experiments by the application of a simple kinetic theory, which is based on the verification of analytic approximations by computer techniques. (Author)

AD-626 746 **See Fld. 20/3**

AD-626 748 **See Fld. 7/4**

AD-626 826 **See Fld. 7/4**

AD-626 883 **See Fld. 20/3**

AD-626 912 **See Fld. 20/9**

AD-626 985 **See Fld. 9/1**

AD-627 058 **See Fld. 7/4**

AD-627 067 **See Fld. 20/8**

AD-627 073 **See Fld. 18/8**

AD-627 094 **See Fld. 14/2**

AD-627 112 **See Fld. 20/4**

AD-627 174 **See Fld. 20/2**

AD-627 178 **See Fld. 9/1**

AD-627 189 **See Fld. 20/3**

AD-627 197 **See Fld. 20/3**

AD-627 222 **See Fld. 7/2**

AD-627 224 **See Fld. 7/2**

AD-627 226 **See Fld. 7/2**

20/13. THERMODYNAMICS

AD-626 785 Fld. 20/13, 11/6
MINNESOTA UNIV MINNEAPOLIS INST OF TECH
THERMAL DIFFUSION OF VACANCIES IN ZINC,
by R. A. Swalin, W. C. Olander, and P. Lin. 23 Feb 65, 8p. Rept. no. TR-8
Contract Nonr-710 (27)

Unclassified report

Availability: Published in Acta Metallurgica v13 p1063-7 Oct 1965. Copies to DDC users only.

Descriptors: (*Zinc, Thermal diffusion), Crystals, Enthalpy, Mass transfer

An apparatus has been constructed for thermal diffusion studies of solids. This apparatus permits a virtually linear temperature gradient to be obtained. Thermal diffusion of vacancies in zinc has been studied in crystals at a mean temperature of 385C with a gradient of 50C/cm. A contraction of the distance between markers was observed at the rate of about 5 microns/cm of sample per 100 hr. Creep caused by surface tension was found to be negligible. From the data a value for the net enthalpy carried by a diffusing atom minus the enthalpy of vacancy formation was found to be -2.3 k cal/mole. (Author)

AD-626 967 Fld. 20/13, 20/4
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
HEAT EMISSION IN THE TURBULENT MOVEMENT OF A LIQUID IN A CIRCULAR CHANNEL,
by V. P. Isachenko, and N. M. Galin. 3 Jan 66, 14p. Rept. no. FTD-TT-65-1774
TT 66-60337

Unclassified report

Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Energetika (USSR) v8 n6 p68-73 1965.

Descriptors: (*Thermal radiation, Pipes), (*Pipes, Fluid flow), Turbulence, Liquids, USSR, Hydraulic systems

AD-627 028 Fld. 20/13, 21/8
CFSTI Prices: HC $4.00 MF $0.75
JET PROPULSION CENTER PURDUE UNIV LAFAYETTE IND
LIQUID-FILM COOLING, ITS PHYSICAL NATURE AND THEORETICAL ANALYSIS,
by R. A. Gater, M. R. L'Ecuyer, and C. F. Warner. Oct 65, 119p. Rept. no. JPC-413, TM-65-6
Contract Nonr-1100 (21)

Unclassified report

Descriptors: (*Film cooling, Physical properties), (*Rocket motors, Film cooling), Liquid cooled, Rocket motor nozzles, Analysis, Theory, Mass transfer, Heat transfer, Gas flow, Phase studies, Stability, Correlation techniques, Pressure

A discussion of the physical nature of liquid-film cooling gives special emphasis to those phenomena occurring at the gas-liquid interface. The interfacial mass and heat balances are discussed in detail, together with the phenomena of film instability and the entrainment of liquid by the gas stream. A review is presented of the pertinent heat-mass transfer analyses for the wall region wetted by the liquid film. The limitations of those analyses are noted, and an alternate correlation procedure is suggested that is applicable to the case where the gas flow is compressible and subject to the influence of a streamwise pressure gradient. In order to implement that correlation procedure, a method is developed whereby the temperature at the gas-liquid interface can be approximated analytically. A heat transfer analysis is presented for the wall region downstream of the liquid film. That analysis is based on a relatively simple flow model, and is applicable to the case where the gas flow is compressible and subject to the influence of a streamwise pressure gradient. Two wall conditions are considered: (a) the case where the wall is adiabatic; and (b) the case where the wall is cooled externally. (Author)

AD-627 075 Fld. 20/13
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
DETERMINING THE OPTIMUM HEATING RATE FOR CERTAIN BODIES,
by A. A. Shevelev. 11 Jan 66, 14p. Rept. no. FTD-TT-65-1810
TT 66-60365

Unclassified report

Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Energetika (USSR) v4 n11 p77-83 1961.

Descriptors: (*Heating, Geometric forms), Thermal stresses, Spheres, Cylindrical bodies, Sheets, Determination, USSR

The process of heating of bodies of regular geometric form is studied taking into account maximum thermal stresses when the temperature of the medium is a linear function of time. Dependences are obtained which make it possible to determine the optimum rate of heating with respect to the permissible value of maximum thermal stresses for any values of the Biot criterion. (Author)

AD-627 120 Fld. 20/13
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
THE GRUNEISEN CONSTANT IN THE THOMASFERMI APPROXIMATION,
by V. P. Kopyshev. 4 Jan 66, 8p. Rept. no. FTD-TT-65-1431
TT 66-60375

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, v161 n5 p1067-8 1965.

Descriptors: (*Equations of state, Approximation (Mathematics)), Atomic structure, Potential theory, Crystal lattices, Pressure, USSR

The equation for the change in potential of a crystal lattice is derived from the displacement of nuclei along the axis alpha, using the method of disturbances in the Thomas-Fermi approximation.

AD-627 158 Fld. 20/13
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MECHANICAL ENGINEERING
METHOD OF CALCULATING HEAT CONDUCTION FROM SPHERES IN RAREFIED GASES,
by George S. Springer, and Stephen W. Tsai. 4 Jun 65, 3p. Contract Nonr-1841 (93)

Unclassified report

Prepared in cooperation with Aeronutronic, Newport Beach, Calif. Research Labs.

Availability: Published in The Physics of Fluids, v8 n8 3p Aug 1965. Copies to DDC users only.

Descriptors: (*Conduction (Heat transfer), Gases), (*Spheres, Conduction (Heat transfer)), Vacuum, Mathematical analysis

Langmuir's model for heat conduction through rarefied gases is extended to spherical geometry.

AD-626 867 **See Fld. 20/2**

AD-626 884 **See Fld. 7/4**

AD-626 885 **See Fld. 7/4**

AD-626 886 **See Fld. 7/4**

AD-626 892 **See Fld. 20/12**

AD-626 917 See Fld. 20/4

AD-627 081 See Fld. 11/6

AD-627 105 See Fld. 7/4

AD-627 112 See Fld. 20/4

AD-627 170 See Fld. 11/7

AD-627 196 See Fld. 20/12

20/14. WAVE PROPAGATION

AD-626 674 Fld. 20/14, 20/9
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
OBLIQUE WAVE PROPAGATION IN A COMPRESSIBLE GENERAL MAGNETOPLASMA,
by H. Unz. Aug 65, 26p. Rept. no. P-3188
Unclassified report

Descriptors: (*Wave transmission, Plasma medium), (*Magnetohydrodynamics, Refractive index), (*Refractive index, Magnetohydrodynamics), Electromagnetic waves, Propagation, Compressible flow, Continuum mechanics, Tensor analysis, Plasma physics

The refractive index equation has been derived for arbitrarily directed oblique waves in compressible general magnetoplasma with arbitrarily directed magneto-static field. The q factor obeys a general sixth order algebraic equation. Booker's quartic equation and Seshadri's result are found as particular cases and other particular cases have been discussed. The general result is checked by using tensor analysis methods and transformation of coordinates. (Author)

AD-626 676 Fld. 20/14, 12/1
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
ON THE DERIVATION OF BOOKER'S QUARTIC FROM APPLETON-HARTREE EQUATION,
by H. Unz. Sep 65, 14p. Rept. no. P-3222
Unclassified report

Descriptors: (*Ionospheric propagation, Electromagnetic waves), (*Refractive index, Ionospheric propagation), Magnetic fields, Tensor analysis, Transformations (Mathematics), Equations of motion

The Booker's quartic equation is derived directly from the Appleton-Hartree equation of the magneto-ionic theory, by using tensor analysis methods and transformation of coordinates. (Author)

AD-626 688 Fld. 20/14
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
BACK-SCATTERING OF ELECTROMAGNETIC WAVES FROM SPHERES AND SPHERICAL SHELLS,
by A. L. Aden. Jul 52, 40p.
AFCRL GRP-15
Unclassified report

Descriptors: (*Electromagnetic waves, Spheres), (*Backscattering, Electromagnetic waves), Numerical methods + procedures

The classical theory of the scattering of a plane electromagnetic wave by a sphere is reviewed, and the difficulties in getting numerical answers from this formal solution are discussed. It is shown how the computations may be simplified by using suitably defined logarithmic derivative functions and the recurrence formulas due to Infeld. By this method, numerical answers for the scattering amplitude coefficients of any order can be computed exactly, even if the index of refraction is complex. The technique mentioned above has been used to determine the scattering amplitude coefficients and the back-scattering cross section for one special case involving water spheres with sizes comparable to the wavelength. The theoretical results are compared with those obtained experimentally. A rigorous solution is also given for the scattering of a plane electromagnetic wave from two concentric spheres of different dielectric constant. This problem is formulated in a manner similar to that for a single sphere, and the scattering amplitude coefficients are expressed in terms of spherical Bessel functions and the logarithmic derivative functions. The application to a particular physical problem is indicated. (Author)

AD-626 762 Fld. 20/14
CFSTI Prices: HC $2.00 MF $0.50
COLUMBIA UNIV NEW YORK DEPT OF ELECTRICAL ENGINEERING
V-LINE SURFACE WAVE RADIATION AND SCANNING.
by P. Diament, S. L. Richter, W. L. Lupatkin, and S. P. Schlesinger. 24 Aug 65, 36p. Rept. no. Scientific-85 CU-14-65
Contract AF19 (628)-2461 Proj. AF-4600 Task 460004
AFCRL 65-725
Unclassified report

See also AD-623 123.

Descriptors: (*Transmission lines, Waveguides), (*Antennas radiation patterns, Transmission lines), Dielectrics, Electromagnetic waves, Propagation, Antenna configurations

The feasibility of converting a surface wave propagating structure, the V-line, into an end-fire or broadside radiator is analyzed theoretically and demonstrated experimentally. It is shown that the radiation may be considered, under suitable design and launching conditions, to be associated with a higher-order hybrid mode of propagation of the cylindrical dielectric rod. End-fire radiation induced by axial truncation and broadside radiation from a parasitic linear array are predicted and verified. A radiation scanning situation simulating electrical control of beam position by varying the permittivity of the binding element is illustrated and discussed critically. (Author)

AD-626 801 Fld. 20/14
COLORADO UNIV BOULDER DEPT OF ELECTRICA f ENGINEERING
PROPAGATION IN A MODEL TERRESTRIAL WAVEGUIDE OF NONUNIFORM HEIGHT: THEORY AND EXPERIMENT,
by E. Bahar, and James R. Wait. May 65, 19p.
Contract NBS-CST-7348 ,ARPA Order-183-62
Unclassified report

RADIO SCIENCE Journal of Research NBS/ USNC-URSI v69D n11 p1445-63 Nov 1965.

Descriptors: (*Electromagnetic waves, Propagation), (*Waveguides, Models (Simulations)), Very low frequency, Radio waves, Electromagnetic wave reflections, Geophysics, Ionospheric propagation

Propagation of electromagnetic waves in multimode waveguides of variable height is investigated. The model consists of two uniform rectangular waveguides connected by a linearly tapered waveguide section. Using a generalized reciprocity theorem for waveguide junctions, a previous quasi-optic solution of this problem is extended to account for reflected waves. The results have application to the theory of VLF radio propagation when the effective height of reflection of the ionosphere boundary varies along the path. The analytical investigation has been complemented by laboratory measurements taken from a two-dimensional microwave model, and good agreement with calculated results was achieved. (Author)

AD-627 052 Fld. 20/14, 4/1
CFSTI Prices: HC $6.00 MF $1.50
NEW ENGLAND UNIV ARMIDALE NSW (AUSTRALIA)
RADIO WAVE INTERACTION USING GYRO-WAVES.
Scientific rept. no. 3 (final), 1 Jul 60-1 Jul 65,
by Reginald A. Smith, Ian A. Bourne, Robert G. Loch, C. S. Gopala K. Setty, and Timothy N. R. Coyne. 17 Jun 65, 285p. Contract AF19 (604)-6177 Proj. AF-5710 Task 07010
AFCRL 65-460
Unclassified report

Descriptors: (*Ionospheric propagation, Magnetooptic effect), (*Radio waves, Perturbation theory), Ionosphere, Electron density, Ionization, Night sky, Solar radiation, Australia

Wave interaction produced in the lower night-time E region by extraordinary gyro-waves was studied for powers up to 500 kW into a circularly polarized array of 40 dipoles. Accurate values of the energy loss coefficient, the electron relaxation time and the electron collision frequency at heights of 85 km in the mesopause and 69 km in the D region were obtained. The electron density profile at the base of the night-time E region was deduced from the variation of the time constant of impressed modulation with frequency of the disturbing wave and is found to be stratified when the analysis is made using the Sen and Wyller M. I. theory. Wave interaction records for the daytime D region were obtained with continuous variation of the transmission time of the disturbing pulse from well ahead of the wanted pulse to just before the return of the wanted echo. Phase-height patterns of partial reflections from the D region were observed, on occasions, to exhibit a remarkable degree of phase coherence. Magneto-ionic formulae for the propagation of gyrowaves and accurate new Q.L. formulae with wide application under non-deviating conditions are given without derivation.

AD-627 161 Fld. 20/14, 4/1, 3/3
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J INST FOR EXPLORATORY RESEARCH
RESULTS OF RADIO-PROPAGATION EXPERIMENTS CONDUCTED DURING THE TOTAL SOLAR ECLIPSE OF 20 JULY 1963.
Technical rept.,
by Stanley J. Schmidt, and Chester E. Sharp. Dec 65, 37p. Proj. DA-1P0-14501-B31A Task 1P0-14501-B31A-00
ECOM 2644
Unclassified report

Descriptors: (*Solar eclipses, Radiofrequency interference), (*Radiofrequency interference, Solar eclipses), (*Radio waves, Propagation), Ionosphere, Electron density, Reduction, Radio transmission, Signal-to-noise ratio, Extraterrestrial radio waves, Medium frequency, Riometers, Radio equipment, Maine, Alaska

A series of radio-wave propagation experiments were conducted during the total solar eclipse of 20 July 1963 to measure its effect on the ionosphere. Receivers monitoring selected optimumly located standard radio broadcast stations and riometers indicating the level of cosmic noise were operated at Copper Center, Alaska, and Jefferson, Maine. A sweep-frequency receiver covering the entire standard broadcast band was also operated at the Maine site during the eclipse. Conclusive proof was obtained that the eclipse did affect propagation conditions at the frequencies utilized for standard broadcasting. Out of a total of eighteen broadcast stations monitored, located at intervals between 560 and 1570 kc/s, the increase in the received signal strengths of seventeen stations ranged from 7.5 to 37 dB. All observed signal variations are asymmetrical with respect to the time of on-the-ground totality. There is a threshold phenomenon evident as the increases in signal strength occurred only when the majority of the sun's radiation was cut off. The riometer operated in Alaska indicated a maximum increase of one-half dB in the level of cosmic noise at 30 Mc/s. The change in cosmic-noise level occurred simultaneously with the beginning of the eclipse, in-

creased to a maximum at ionospheric totality, and returned to normal at last contact. (Author)

AD-626 696 **See Fld. 9/1**

AD-626 700 **See Fld. 4/1**

AD-626 905 **See Fld. 9/4**

Field 21-PROPULSION AND FUELS

AD-626 740 **See Fld. 21/8.2**

21/2. COMBUSTION AND IGNITION

AD-626 856 Fld. 21/2, 12/1, 7/1
CFSTI Prices: HC $2.00 MF $0.50
WISCONSIN UNIV MADISON DEPT OF STATISTICS
A DISCRETE PREDICTOR CONTROLLER APPLIED TO SINUSOIDAL PERTURBATION ADAPTIVE OPTIMIZATION.
Technical rept.,
by G. E. P. Box, R. J. Altpeter, and K. D. Kotnour. Nov 65, 29p. Rept. no. TR-58
Unclassified report

Descriptors: (*Combustion, Control systems), (*Optimization, Combustion), Mathematical prediction, Analog computers, Perturbation theory, Chemical reactions, Statistical analysis

Uncontrollable and unmeasurable disturbances possessing nonstationary characteristics often create major control problems in chemical processes. Typical of these fluctuations are composition changes in a homogeneous system and catalyst activity changes in a heterogeneous system. In this report, Box and Jenkins' theory of discrete predictive control is mechanized on an analog computer and applied to sinusoidal perturbation adaptive optimization of a natural gas combustion system. Process dynamics and the stochastic characteristics of disturbances are programmed into the discrete predictor controller to provide an adaptive control system which allows for process upsets before they occur. Statistically designed experiments are constructed to evaluate the performance. An outline of the theory and a description of the equipment is presented. Results show that the insertion of the discrete predictor controller into the adaptive control loop provides significant improvement over the conventional proportional feedback of sinusoidal adaptive optimization. (Author)

AD-626 965 Fld. 21/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ON THE CALCULATION OF A PRESSURE RISE ON A COMBUSTION FRONT,
by N. N. Bakhman. 3 Jan 66, 13p. Rept. no. FTD-TT-65-1771
TT 66-60335
Unclassified report

Unedited rough draft trans. of Zhurnal Prikladnoi Mekaniki i Tekhnicheskoi Fiziki (USSR) n1 p106-8 1965.

Descriptors: (*Combustion, Pressure), Mathematical analysis, Combustion products, Thermal radiation, USSR, Velocity

AD-627 071 Fld. 21/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
EXPERIMENTAL COMBUSTION CHAMBER WITH WATER COOLING,
by A. A. Mikulin, and N. N. Zagryazkin. 3 Jan 66, 18p. Rept. no. FTD-TT-65-1282
TT 66-60361
Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Institut Dvigatelei. Trudy, v5 p27-33 1960.

Descriptors: (*Combustion chambers, Operation), Combustion chamber gases, Flames, USSR, Water, Cooling, Ignition, Fuel oil, Combustion

A general discussion is given concerning the combustion which takes place within a combustion chamber.

AD-627 155 Fld. 21/2
CORNELL UNIV ITHACA N Y GRADUATE SCHOOL OF AEROSPACE ENGINEERING
ELECTRODE INTERACTIONS IN SEEDED COMBUSTION PRODUCTS,
by Donald L. Turcotte, and William Friedman. 1965, 12p.
Unclassified report

Availability: Published in Symposium (International) on Combustion (10th), The Combustion Inst. p673-83 1965. Copies to DDC users only.

Descriptors: (*Electrodes, Combustion products), (*Flames, Electrical properties), (*Combustion products, Electrical properties), Combustion, Plasma medium, Shock tubes, Theory, Test methods

The interaction of a lightly ionized plasma with a cold electrode is studied. Current-voltage characteristics have been measured using cooled electrodes in seeded combustion products. Current-voltage characteristics have also been obtained in lightly ionized air in a shock tube. An isothermal theory for the current-voltage characteristics is presented including the voltage drop in the sheath, the boundary layer, and the plasma. The shock-tube experiments exhibit ion saturation and are in reasonable agreement with theory. No ion saturation is observed in the experiments in seeded combustion products. Agreement between theory and experiment is obtained with the voltage drop across the sheath and boundary layer is neglected. The fact that no ion saturation is observed indicates that there is electron emission from the cooled electrodes in the seeded combustion products. Since cooled copper electrodes are not expected to emit electrons and do not emit electrons in the shock tube experiment, the conclusion is that the electron emission is due to the presence of seed material. (Author)

AD-627 257 Fld. 21/2, 19/1
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AMMUNITION DEPOT CRANE IND
IGNITION THEORY: APPLICATION TO THE DESIGN OF NEW IGNITION SYSTEMS,
by Duane M. Johnson. 24 Nov 65, 22p. Rept. no. RDTR-56
Unclassified report

Descriptors: (*Pyrotechnics, Ignition), (*Ignition, Pyrotechnics), (*Solids, Ignition), Igniters, Design, Physical properties, Chemical properties, Thermal properties, Energy, Theory, Partial differential equations

A theory is presented on the ignition of solid compositions. The effect of certain physical, chemical and thermal properties of a solid composition on the ignition time and ignition energy is explained and supported by experimental evidence. Different types of ignition systems are described. Problem areas of the normal ignition systems are discussed and a technique to overcome these problem areas is offered. By use of the developed ignition theory and a hot-bath immersion test apparatus, a technique of determining the true ignition temperature of a composition is described. (Author)

AD-626 718 **See Fld. 21/8**

AD-626 719 **See Fld. 21/9**

AD-626 720 **See Fld. 21/8**

AD-626 721 **See Fld. 21/9**

AD-626 722 **See Fld. 21/8**

AD-626 723 **See Fld. 21/8**

AD-626 724 **See Fld. 21/8**

AD-626 736 **See Fld. 21/8**

AD-626 739 **See Fld. 21/8**

AD-626 741 **See Fld. 21/8**

AD-626 742 **See Fld. 21/9**

AD-626 756 **See Fld. 21/8**

21/3. ELECTRIC PROPULSION

AD-626 972 Fld. 21/3, 20/9
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
THE NEUTRALIZATION OF SPHERICALLY DIVERGENT FLUXES OF CHARGED PARTICLES,
by V. A. Levin. 11 Jan 66, 10p. Rept. no. FTD-TT-65-1812
TT 66-60342
Unclassified report

Unedited rough draft trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n3 p68-70 1965.

Descriptors: (*Ion beams, Recombination reactions), (*Ion engines, Ion beams), Cesium, Ions, Electrons, Electric propulsion, USSR

The process is examined of neutralization of a spherically divergent flux of ions. It is shown that depending upon the magnitudes of the determining parameters two different behaviors of the potential in the neutralized flux are possible. In contrast to the planar case, when undamped oscillations of potential occur in the spherical case the potential either achieves damped oscillations or monotonically goes to the limiting value. The results of numerical calculation for neutralization of a flux of cesium ions by electrons are introduced as an example.

AD-626 975 Fld. 21/3
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
PHOTON REACTION ENGINE,
by E. S. Fridenson. 11 Jan 66, 17p. Rept. no. FTD-TT-65-1815
TT 66-60345
Unclassified report

Unedited rough draft trans. of Vestnik Protivovozushnoi Oborony (USSR) n9 p67-71 1964.

Descriptors: (*Space propulsion, Photons), (*Photons, Space propulsion), Electric propulsion, USSR, Thrust, Electromagnetism, Relativity theory, Rockets, Operation

Operating principles of the engine and prospects of its creation are discussed.

21/4. FUELS

AD-626 963 Fld. 21/4
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ABRASIVE PROPERTIES OF MICROCONTAMINATION AND OXIDATION PRODUCTS OF JET FUELS,
by V. A. Piskunov, and V. N. Zrelov. 13 Jan 66, 11p. Rept. no. FTD-TT-65-1448
TT 66-60333
Unclassified report

Unedited rough draft trans. of Khimiya i Tekhnologiya Topliv i Masel (USSR) v10 n5 p49-52 1965.

Descriptors: (*Jet engine fuels, Contamination), (*Fuel contamination, Jet engine fuels), Abrasives, Erosion, Oxidation, Corrosion, Friction, Fuel systems, Fuel pumps, Thermal stability, Particle size, Supersonic planes, Transportation, Storage, USSR

Conclusions: Microcontaminants and residues from thermooxidation origin in fuel are the cause of abrasive wear of the hydraulic channels and jet nozzles of the fuel-regulating apparatus of jet engines. The extent of the abrasive wear of the fuel-regulating apparatus of the engines depends on the amount and make-up of the microcontaminants and residues in the fuel determinable by the conditions of the transportation, storage, and application of the fuels and their thermal stability. For lowering the abrasive action of the microcontaminants and residues, it is necessary to increase the fineness of the filtration and improve the thermal stability of the fuels (additives, etc.). (Author)

21/5. JET AND GAS TURBINE ENGINES

AD-627 113 Fld. 21/5
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
GAS-TURBINE ROTOR TEMPERATURE FIELD WITH COOLING AIR BLOWN THROUGH SLOTS IN ROOT ATTACHMENTS,
by K. P. Seleznev. 21 Dec 65, 19p. Rept. no. FTD-TT-65-1321
TT 66-60372
Unclassified report

Unedited rough draft trans. of Politekhnicheskii Institut, Leningrad. Trudy (USSR) n228 p44-54 1963.

Descriptors: (*Gas turbine rotors, Cooling), Turbine blades, Temperature, Gas flow, USSR, Thermal analysis, Engine air systems components

Topics include: rotor temperature field, effect of cooling-airflow rate and leakage into the flow-through section of the rotor temperature field, effective coolingair temperature on rotor temperature field, and some rotor temperature-field considerations with cooling air supplied to ring seals and to disk faces.

21/7. RECIPROCATING ENGINES

AD-627 068 Fld. 21/7
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
LIQUID FUEL INJECTOR,
by I. E. Ulyanov, and N. S. Lamekin. 28 Sep 65, 7p. Rept. no. FTD-TT-65-1011
TT 66-60358
Unclassified report

Unedited rough draft trans. of Russian patent 123 375, appl. 57644/25, 12 Jan 56, 2p.

Descriptors: (*Fuel injectors, Patents), Ultrasonic radiation, Atomization, Fuels, USSR

A fuel injector which uses ultrasonic vibration to assure atomization is presented. The atomization process is independent of the fuel feed pressure. A pneumatic generator in the form of a volumetric resonator provided with a slit acts as the ultrasonic vibrator.

AD-627 098 Fld. 21/7
CFSTI Prices: HC $1.00 MF $0.50
HOLMAN (JOHN F) CO INC WASHINGTON D C
NEW PRINCIPLE OF IGNITION AND COMBUSTION IN ENGINES,
by L. A. Gussak. 1965, 22p. Contract DA-44-009-AMC-930 (T) Proj. DA-1-M-643-324-D-591
AERDL T-1814, TT66-60369
Unclassified report

Trans. of Akademiya Nauk SSSR. Izvestiya. Energetika i Transport, n4 p98-110 1965.

Descriptors: (*Internal combustion engines, Performance (Engineering)), Combustion, Ignition, Spark ignition engines, Tests, Vehicles, USSR

The article considers the shortcomings of internal combustion engines associated with the combustion process taking place in them. It also describes a new principle of ignition and combustion of the working mixture (precombustion chamber jet ignition) and presents data on the improvement of performance in precombustion chamber engines compared with spark ignition engines. These data were obtained during numerous testings of these engines on trucks and light automobiles. (Author)

21/8. ROCKET MOTORS AND ENGINES

AD-627 028 See Fld. 20/13

21/8.1 LIQUID ROCKET MOTORS

AD-626 723 See Fld. 21/8

AD-626 765 See Fld. 22/4

AD-626 766 See Fld. 22/4

AD-626 767 See Fld. 22/4

AD-626 768 See Fld. 22/4

AD-626 769 See Fld. 22/4

21/8.2 SOLID ROCKET MOTORS

AD-626 718 Fld. 21/8.2, 20/1, 21/2, 21/9.2
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
ACOUSTIC RADIATION FROM PRESSURE-ANTISYMMETRIC MODES OF A CENTRALLY VENTED CYLINDRICAL CAVITY.
by R. W. Hart, and R. H. Cantrell. Aug 62, 22p. Rept. no. tg-335-13
Contract NOw-62-0604-c
Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Acoustics), (*Combustion chambers, Acoustics), Cylindrical bodies, Oscillation, Stability, Orifices, Analysis of variance, Integrals, Solid rocket propellants

The losses associated with the pressure-antisymmetric modes of centrally vented cylindrical cavities are of special interest because of their relevance to acoustic instability of rocket motors. Because the pressure amplitude of such an unperturbed mode is highly nonuniform over the orifice, the usual lumped circuit calculation is invalid. If it is used in spite of this, one finds no radiation out of the orifice. A variational analysis was carried out to obtain a quantitative estimate of the loss which should actually occur. (Author)

AD-626 720 Fld. 21/8.2, 21/9.2, 20/1, 21/2
CFSTI Prices: HC $3.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
THEORY OF ACOUSTIC INSTABILITY IN SOLID PROPELLANT ROCKET COMBUSTION.
by R. W. Hart, and F. T. McClure. Apr 64, 56p. Rept. no. tg-335-17
Contract NOw-62-0604-c
Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Acoustics), (*Solid rocket propellants, Acoustics), Combustion, Theory, Stability, Combustion chambers, Oscillation, Nonlinear systems, Erosive burning, Vortices, Nozzle gas flow, Torque

The problem of unstable combustion in solid propellant rockets is reviewed, with special emphasis on the status of theory and, where possible, the comparison between theory and experiment. General topics include the general nature of the problem; linear theory of acoustic response of burning propellants; and the status of finite amplitude theory.

AD-626 722 Fld. 21/8.2, 20/1, 21/2, 21/9.2
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
SOLID PROPELLANT ROCKET MOTORS AS ACOUSTIC OSCILLATORS.
by F. T. McClure, R. W. Hart, and J. F. Bird. 5 Oct 59, 47p. Rept. no. tg-335-3
Contract NOrd-7386
Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Acoustics), Oscillation, Combustion chambers, Combustion chamber gases, Boundary layer, Erosive burning, Solid rocket propellants, Fracture (Mechanics), Resonance

A solid propellant rocket motor can be regarded as an acoustic cavity containing two media, the solid and the gas. The thin burning zone is rather generally capable of amplifying pressure disturbances at the surface, and self sustaining oscillations occur when this gain balances the cavity losses. The tendency to oscillate in a given cavity mode is thus greatest when the web thickness is such that the mode has an acoustic pressure maximum at the surface, while stability is assured when the surface is at a pressure node. The frequencies of the modes and their regions of instability are sensitive to the propellant case boundary condition. Changes in mean burning rate arise from the 'erosive burning' associated with tangential surface velocities and are positive or negative according to whether the propellant is characterized by positive or negative 'erosive burning' under the prevailing conditions. Fracture in brittle propellants and changes in burning properties may occur as results of acoustic 'working' of the solid. (Author)

AD-626 723 Fld. 21/8.2, 21/8.1, 20/1, 21/2
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
ON ACOUSTIC DAMPING IN CAVITIES WITH MEAN VELOCITY AND THERMAL BOUNDARY LAYERS.
by R. H. Cantrell, F. T. McClure, and R. W. Hart. Dec 62, 40p. Rept. no. tg-335-14
Contract NOw-62-0604-c
Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Acoustics), (*Rocket motors (Liquid propellant), Acoustics), Combustion chambers, Oscillation, Damping, Fluid flow, Cooling, Boundary layer, Thermodynamics

Viscous and thermal losses of acoustic energy at a metal wall are calculated for the condition in which there is a low Mach number flow sustaining a temperature difference between the gas and the wall. The acoustic loss is found to decrease as the walls are cooled below the temperature of the main body of the gas. The results of the study are relevant to experiments on acoustic amplification by solid rocket propellants and to at least some cases of liquid propellant rocket acoustic instability. (Author)

AD-626 724 Fld. 21/8.2, 21/2, 20/1, 21/9.2
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
INTERACTION BETWEEN SOUND AND FLOW-STABILITY OF T-BURNERS.
by F. T. McClure, R. W. Hart, and R. H. Cantrell.
Jul 62, 24p. Rept. no. tg-335-12
Contract NOrd-7386

Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Acoustics), (*Combustion chambers, Acoustics), Solid rocket propellants, Combustion, Cylindrical bodies, Gas flow, Orifices, Boundary layer, Transformations (Mathematics)

The question of the effect of gas flow on the damping of an acoustic cavity with an orifice is of considerable importance in connection with the experimental determination of the acoustic admittance of burning solid propellants. The present investigation considers a center-vented rigid-walled cylindrical cavity which contains burning propellant at either or both ends. The only acoustic loss mechanism considered is that of the orifice. It is found that the presence of flow will, in general, have a significant effect on the conditions necessary for the acoustic stability of such a cavity and on the interpretation of the growth and decay rates in terms of the acoustic admittances characterizing the ends of the cavity. (Author)

AD-626 736 Fld. 21/8.2, 20/1, 21/2, 21/9.2
CFSTI Prices: HC $3.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
ON ACOUSTIC RESONANCE IN SOLID PROPELLANT ROCKETS,
by F. T. McClure, R. W. Hart, and J. F. Bird. 19 Sep 59, 68p. Rept. no. TG-335-2
Contract NOrd-7386

Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Acoustics), (*Solid propellants, Acoustics), Resonance, Combustion chamber gases, Boundary layer, Stability, Viscoelasticity, Pyrolysis

Attention is drawn to the fact that the solid propellant must, in general, be considered as one of the acoustic media in a rocket motor. The viscoelastic properties of the solid along with those of the burned gases determine the characteristic modes of the system corresponding to the particular boundary conditions imposed on these media by the metal components. In addition these properties of the media contribute strongly to the selection of the regions of stability and instability of the system and therefore to the intermittent and sporadic nature characteristic of resonant burning in solid propellant motors. Calculations are carried out to illustrate the general nature of the phenomenon, and the relationship of these studies to a variety of experimental observations is discussed. (Author)

AD-626 739 Fld. 21/8.2, 21/2, 20/1, 21/9.2
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
THE INFLUENCE OF EROSIVE BURNING ON ACOUSTIC INSTABILITY IN SOLID PROPELLANT ROCKET MOTORS,
by R. W. Hart, J. F. Bird, and F. T. McClure.
Apr 60, 37p. Rept. no. TG-335-6
Contract NOrd-7386

Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Acoustics), (*Solid rocket propellants, Erosive burning), (*Erosive burning, Solid rocket propellants), Stability, Fluid flow, Rocket motor nozzles, Boundary value problems, Integral transforms

The influence of erosivity on the acoustic stability of solid fuel rockets is examined. Allowance is made for a frequency-dependent erosion constant. The theory verifies the stabilizing influence of the steady flow erosivity for propellants having positive erosion constants, with the contrary prediction for those having negative erosion constants. The influence of acoustic erosion is examined and the order in which it contributes is shown to depend on the symmetry of the flow field in the rocket, being quite different for rockets with nozzles at the end as compared to rockets with nozzles in the center. Degenerate and quasi-degenerate cases where erosivity might become a predominant effect are discussed. (Author)

AD-626 740 Fld. 21/8.2, 20/1, 21, 21/9.2
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
EFFECTS OF GAS PHASE AND SOLID PHASE DAMPING ON INSTABILITY OF LOW FREQUENCY MODES IN SOLID PROPELLANT ROCKETS,
by Owen J. Deters. Oct 61, 36p. Rept. no. TG-335-7
Contract NOrd-7386

Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Acoustics), Oscillation, Damping, Gases, Solids, Combustion, Stability

Gas phase and solid phase damping are known to have important effects on the instability patterns in the high frequency (tangential) modes of solid propellant rockets. In particular, intermittency can be associated with damping in the solid phase. The low frequency modes are investigated for several different boundary conditions applied to the solid, with emphasis on these two acoustic loss mechanisms. As a consequence, it is noted that intermittency is not expected to be characteristic of instability in such modes. However, the instability when not continuous throughout burning may be limited to the early portion of the burning time by these mechanisms. (Author)

AD-626 741 Fld. 21/8.2, 20/1, 21/2, 21/9.2
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
ACOUSTIC INSTABILITY IN THE TRANSVERSE MODES OF SOLID PROPELLENT ROCKETS,
by J. F. Bird, F. T. McClure, and R. W. Hart. Jun 61, 36p. Rept. no. TG-335-8
Contract NOrd-7386

Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Acoustics), Oscillation, Stability, Damping, Combustion chamber gases

Acoustic instability in solid propellant rocket motors is a question of the balance of the acoustic gains and losses in the system. With special reference to transverse modes, this question is examined with respect to those loss and gain mechanisms for which some limited information is available. It is interesting that, depending on which mechanisms are predominant, the critical conditions for instability may be quite different functions of the parameters characterizing the rocket. A possible mechanism consistent with the main results of Brownlee and Marble is presented. (Author)

AD-626 756 Fld. 21/8.2, 21/2, 20/1, 21/9.2
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
AN EROSION MECHANISM FOR NON-LINEAR INSTABILITY IN THE AXIAL MODES OF SOLID PROPELLANT ROCKET MOTORS,
by F. T. McClure, J. F. Bird, and R. W. Hart. Oct 61, 26p. Rept. no. TG-335-9
Contract NOrd-7386

Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Acoustics), (*Solid propellants, Erosive burning), (*Erosive burning, Solid rocket propellants), Oscillation, Nonlinear systems, Stability, Burning rate, Combustion chamber gases, Fluid flow

Acoustic instability in a solid fuel rocket engine arises from the interaction of sound waves with the burning propellant. An interesting non-linearity arising from acoustic erosivity is investigated, i.e., the dependence of the burning rate on the magnitude (but not the direction) of the fluctuating gas velocity parallel to the transpiring surface. This non-linearity is of first order in the acoustic amplitude, and so can be significant even when higher-order effects are negligible. A simple calculation of the stability in axial modes is presented to illustrate the phenomenon, and it is shown, for example, that a motor stable at low acoustic amplitudes can be unstable at moderate amplitudes due to the non-linearity of erosion. (Author)

AD-626 719 See Fld. 21/9

AD-626 721 See Fld. 21/9

AD-626 737 See Fld. 20/11

AD-626 738 See Fld. 20/11

AD-626 742 See Fld. 21/9

21/9.2 SOLID ROCKET PROPELLANTS

AD-626 719 Fld. 21/9.2, 20/1, 21/2, 21/8.2
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
AMPLIFICATION AND ATTENUATION OF SOUND BY BURNING PROPELLANTS.
by R. W. Hart, and R. H. Cantrell. Apr 62, 36p. Rept. no. tg-335-11
Contract NOrd-7386

Unclassified report

Descriptors: (*Solid rocket propellants, Acoustics), Oscillation, Attenuation, Rocket motors (Solid propellant), Stability, Combustion, Pressure, Entropy, Boundary layer

From the point of view of determining the acoustic stability of a solid propellant rocket motor, it is vital to know whether or not a sound wave is amplified or attenuated upon reflection from the burning surface. If amplification occurs, instability may result. This question has two parts to its answer. The first part concerns the burning response of the combustion layer itself to an acoustic pressure fluctuation, and the second part concerns the matching of an incident and reflected sound wave at the surface in order to determine whether the reflected wave has been amplified or attenuated. In previous theoretical treatments it has been customary to ignore the simultaneous existence of thermal or entropy waves when performing this matching procedure. In this study, the detailed matching of the thermo-acoustic field at the combustion zone boundary is carried out and the results are examined in the light of previous studies

on the acoustic stability of solid propellant rocket motors. (Author)

AD-626 721 Fld. 21/9.2, 20/1, 21/2, 21/8.2
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
EFFECTS OF THERMAL RADIATION ON THE ACOUSTIC RESPONSE OF SOLID PROPELLANTS.
by R. H. Cantrell, F. T. McClure, and R. W. Hart. Jun 64, 46p. Rept. no. tg-335-18
Contract NOw-62-0604-c

Unclassified report

Descriptors: (*Solid rocket propellants, Acoustics), Thermal radiation, Combustion chamber gases, Oscillation, Burning rates, Heat transfer

Theoretical calculations are given for the propellant response function when thermal radiation of the burnt gases is taken into account. Under the assumption that the gas radiates as a gray body, it is found that radiation effects may significantly alter the response function at low frequencies for the low propellant burning rates which are commonly found at low pressures. Thus, this mechanism may offer a partial explanation of the fact that experimental values for the response function at low frequencies and low burning rates tend to be larger than is expected from existing theories. The method of calculation is based on a second order perturbation scheme where the perturbation parameter is a measure of the ratio of energy transfer by radiation to convective energy transfer. (Author)

AD-626 742 Fld. 21/9.2, 20/1, 21/2, 21/8.2
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
ACOUSTIC ATTENUATION IN A SOLID PROPELLANT,
by B. H. Nall. Apr 62, 28p. Rept. no. TG-335-10
Contract NOrd-7386

Unclassified report

Descriptors: (*Solid rocket propellants, Acoustics), Oscillation, Excitation, Resonance, Attenuation, Thermal properties, Pressure, Combustion

The acoustic attenuation in 1-inch diameter by 15-inch long rods cast from a double base propellant mixture was measured for longitudinal excitation from 500 to 14,000 cps in discrete steps by the successive use of quarterwave resonance, half-wave resonance and pulse techniques. The data are observed to give a reasonable fit to a Q of 5.5. No change in Q is observed for quarterwave resonance data taken over the range of temperatures 55-75F, but the velocity of sound in the rod is found to be a sensitive decreasing function of the temperature. The effect on halfwave resonance of increasing the static pressure from one atmosphere to 1000 psi is found to be small, with a slight decrease in Q and in velocity. Room temperature propellant sound velocity is about 810 meters/sec, giving an effective Young's Modulus = 1.1 x 10 to the 10th power dynes/sq. cm. (Author)

AD-627 253 Fld. 21/9.2, 7/2
CFSTI Prices: HC $2.00 MF $0.50
FRANKFORD ARSENAL PHILADELPHIA PA QUALITY ASSURANCE DIRECTORATE
DETERMINATION OF CARBON BLACK AND GRAPHITE IN NITRO-CELLULOSE-BASE PROPELLANTS.
Test rept.,
by George Norwitz, and Michael Galan. Nov 65, 39p. Rept. no. T66-3-1

Unclassified report

Descriptors: (*Solid rocket propellants, Chemical analysis), (*Carbon black, Chemical analysis), (*Graphite, Chemical analysis), Nitrocellulose, Spectroscopy, Colorimetry, Nitric acid, Gravimetric analysis, Hydrochloric acid, O-heterocyclic compounds, N-heterocyclic compounds, Tin

The entire problem of determining carbon black and graphite in nitrocellulose-base propellants was investigated. It is shown that available methods for the determination of carbon black leave much to be desired, especially if carbon black and graphite are both present. A new spectrophotometric method for the determination of carbon black in propellants is proposed that depends upon the yellow color obtained when carbon black is dissolved by boiling with nitric acid. Improved gravimetric procedures are proposed for the determination of graphite in nitrocellulose-base propellants by the morpholine, nitric acid, and nitric-hydrochloric acid methods. Also described is an improved procedure for the determination of graphite and tin on the same sample. The results obtained for all the methods for graphite are compared.

AD-626 718 **See Fld. 21/8**

AD-626 720 **See Fld. 21/8**

AD-626 722 **See Fld. 21/8**

AD-626 724 **See Fld. 21/8**

AD-626 736 **See Fld. 21/8**

AD-626 739 **See Fld. 21/8**

AD-626 740 **See Fld. 21/8**

AD-626 741 **See Fld. 21/8**

AD-626 756 **See Fld. 21/8**

AD-626 805 **See Fld. 7/2**

Field 22-SPACE TECHNOLOGY

22/1. ASTRONAUTICS

AD-626 935 Fld. 22/1, 22/2, 22/3, 22/4
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
A COMPARISON OF U. S. AND SOVIET EFFORTS TO EXPLORE MARS,
by Bruce C. Murray, and Merton E. Davies. Jan 66, 42p. Rept. no. P-3285

Unclassified report

Descriptors: (*Mars (Planet), Exploration), (*Space probes, Mars (Planet)), United States, USSR, Astronautics, Launch vehicles (Aerospace), Spacecraft, Photographs, Space flight, Interplanetary trajectories, Tables

Contents: The U. S. program: The Mariner C program; The Atlas/Centaur program; The Voyager program. The Soviet program: History of the program; Photographic efforts and capability; Scientific objectives. Comparison of past efforts; Comparative technological achievements; Comparative scientific objectives and achievements; Future prospects for the Soviet programs; Future prospects for the U. S. program.

AD-627 207 Fld. 22/1, 5/4
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
ON PROBLEMS CONCERNING THE LEGAL STATUS OF OUTER SPACE,
by Liu Tse-Yung. 2 Jun 61, 25p. Rept. no. T-141
Contract AF49 (638)-700
TT 66-60387

Unclassified report

Trans. from Kuo Chi Wen Ti Yen Chiu (sic) (Chinese People's Republic) n8 Dec 1959.

Descriptors: (*Space flight, International law), (*International law, Space flight), Extraterrestrial topography, China

The scientific development with regard to space missiles (intercontinental ballistic missile) and man-made satellites has today introduced a new era in the advancement of man. The pattern of the use of outer space by scientific means will undoubtedly unfold in a context of conditions which will be certain to effect the law of space as it develops over the years. This has brought about the present situation with respect to international law of outer space. The concept of outer space law and its various legal interpretations have also become matters of international significance. However, the aggressive attempt of the United States imperialists in regard to the possible use of outer space has further created aggravated conflicts between two camps, namely, whether the exploration of outer space is for 'peaceful purposes' or for 'military purposes.' (Author)

AD-626 979 **See Fld. 6/19**

AD-627 192 **See Fld. 22/3**

22/2. SPACECRAFT

AD-626 680 Fld. 22/2
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
WEIGHTS OF ENVIRONMENTAL-CONTROL SYSTEMS,
by Stephen H. Dole. Jan 66, 7p. Rept. no. P-3297

Unclassified report

Presented at the Annual Meeting of the Working Group on Extraterrestrial Resources (4th), USAF Academy, Colorado Springs, Colo., 1 Dec 65.

Descriptors: (*Spacecraft, Weight), (*Environment, Control systems), Space flight, Closed ecological systems, Equations

Generalized relationships are presented that can be used for estimating the weights of environmental-control equipment and expendables required for supporting human beings on space missions. Dry weight was defined as including breathing-gas supply, carbon dioxide removal, humidity control, trace contaminants removal, fresh water supply, thermal control, and waste management. The equation derived for dry weight (W sub D) was: W sub D = 117 N (to the 0.58 power) T (to the 0.33N power to the 0.11 power), where N is the number of men in the crew and T is the unresupplied duration of the mission in days. The expression produced dry weights within =20% of those obtained from 23 contractors' reports in all but 2 instances. Total weights were estimated by adding weights of expendables to dry weights. The total weight (W sub T) expression was W sub T = W sub D + N (19 T (to the 1/2 power) + 2 T). The total weight estimates were generally within =40% of those obtained from contractors' supports.

AD-627 048 Fld. 22/2, 20/11
CFSTI Prices: HC $5.00 MF $1.00
INTERNATIONAL BUSINESS MACHINES CORP SAN JOSE CALIF
PAPERS ON THE CONTROL OF DISTRIBUTED PARAMETER AEROELASTIC SYSTEMS.
Final rept., 1 May 63-1 Nov 64,
by M. L. Bandy, W. E. Langlois, and P. K. C. Wang. Nov 65, 174p. Rept. no. RJ-305 ,NJ-62
Contract AF33 (657)-11545 Proj. AF-8225
Task 822501
AFFDL TR-65-145

Unclassified report

Descriptors: (*Aeroelasticity, Aerospace craft), (*Aerospace craft, Control systems), Mathematical models, Flexible structures, Stability, Equations of motion, Reports

This work was undertaken in order to gain a more fundamental understanding of the control of distributed parameter systems, with emphasis on the control of flexible aerodynamic vehicles. The main effort was on the development of a control theory for distributed parameter systems rather than the development of techniques for approximating distributed parameter systems by lumped parameter systems for which existing control theory is applicable. (Author)

AD-627 095 Fld. 22/2, 22/3
CFSTI PricesMF $0.50
AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-PATTERSON AFB OHIO
ADAPTIVE VERSUS NON-ADAPTIVE CONTROL OF LIFTING ENTRY VEHICLES,
by Robert L. Swaim. Jan 66, 18p. Proj. AF-8219

Unclassified report

Prepared for presentation at the AIAA Aerospace Sciences Meeting (3rd), 24-26 Jan 66. AIAA-Paper-66-48.

Availability: American Inst. of Aeronautics and Astronautics, 1290 Ave. of the Americas, New York. HC $1.00.

Descriptors: (*Adaptive control systems, Feasibility studies), (*Reentry vehicles, Control systems), Lift, Manned spacecraft, Atmosphere entry

A critical assessment is made of the need for adaptive flight control systems and their associated complexities compared to non-adaptive systems for lifting entry vehicles, both manned and unmanned. The intent of the paper is to stimulate a little more careful thought as to whether an adaptive system is really essential in a given application. One might expect that the need for adaptive control would be somewhat different for manned than for unmanned vehicles performing similar missions. However, little attention has been given to these differences by proponents of various adaptive schemes. In any given application, the basic question which should be answered before committing oneself to an adaptive system is: Given bounds on plant parameter variations or uncertainties and on disturbance inputs, and given acceptable tolerances on system response, what is the optimum, linear, fixed compensation control system (non-adaptive). (Author)

AD-627 208 Fld. 22/2, 9/6
DEFENCE RESEARCH TELECOMMUNICATIONS ESTABLISHMENT OTTAWA (ONTARIO) ELECTRONICS LAB
TELEMETRY AND COMMAND SYSTEMS FOR THE CANADIAN IONOSPHERIC SATELLITE,
by C. A. Franklin, R. J. Bibby, and R. F. Sturrock. Dec 65, 17p. Rept. no. DRTE-1157

Unclassified report

Prepared for presentation at the International Telemetering Conference, London (England), 23-27 Sep 63.

Availability: Published in Conference Proceedings v1 p457-70 1963. Copies to DDC users only.

Descriptors: (*Satellites (Artificial), Canada), (*Telemeter systems, Scientific satellites), (*Command + control systems, Scientific satellites), Instrumentation, Design, Performance (Engineering), Atmospheric sounding

This paper describes the design and performance of the telemetry and command systems in the Alouette earth satellite. The primary objective of the spacecraft was to measure electron density distributions in the topside of the ionosphere using a swept-frequency pulse ranging technique. Secondary experiments were added to measure particle fluxes, cosmic noise, and v.l.f. emissions. Instrumentation was also provided to monitor 60 engineering data channels. Data storage is not used and the spacecraft is directly monitored by a network of 13 ground stations. Data bandwidth for the primary experiment is 0.5 c/s-15 kc/s and for the v.l.f. experiment 400 c/s-10 kc/s. All other data channels have bandwidths in the range 20 c/s-150 c/s. Three v.h.f. transmitters are used, two for telemetry and one for tracking. A 2 W true f.m. transmitter operating at 136.080 Mc/s is directly modulated by the wideband data from the primary and v.l.f. experiments. A/w p.m. transmitter operating at 136.590 Mc/s transmits engineering data and narrow band information from secondary experiments. A 50 mW c.w. tracking beacon operates continuously at 136.980 Mc/s. A 7-tone command system provides means for on-off control of the spacecraft, for selection of redundant units, and for choice of a number of possible operational modes. (Author)

AD-627 209 Fld. 22/2, 9/6
DEFENCE RESEARCH TELECOMMUNICATIONS ESTABLISHMENT OTTAWA (ONTARIO) ELECTRONICS LAB
ELECTRONIC AND SYSTEM DESIGN OF THE CANADIAN IONOSPHERIC SATELLITE,
by C. A. Franklin, R. J. Bibby, R. F. Sturrockand, and D. F. Page. Dec 65, 19p. Rept. no. DRTE-1158

Unclassified report

Prepared for presentation at the International Convention of the IEEE, New York, 25-28 Mar 63.

Availability: Published in IEEE International Convention Record v11 pt5 p64-72 1963. Copies to DDC users only. See also AD-627 208.

Descriptors: (*Satellites (Artificial), Canada), (*Telemeter systems, Scientific satellites), (*Command + control systems, Scientific satellites), Instrumentation, Systems engineering, Design, Performance (Engineering), Atmospheric sounding

The Canadian Ionospheric satellite was designed primarily to measure electron density profiles in the topside of the ionosphere. A 100-microsecond pulse sounder sweeps from 1 - 12 Mc/s in approximately 10 seconds, and produces data in the form of transmitted and received echo pulses. Synchronizing and frequency calibration pulses are added to form a composite video signal that directly modulates a 2-watt true F. M. telemetry transmitter. The need for efficient operation over the band 1.5 - 12 Mc/s introduced severe electrical and mechanical problems. The sounder has two extendable crossed dipoles measuring 150 feet and 75 feet tipto-tip respectively, which are driven by a wide band 100-watt solid state transmitter. Spare batteries and transmitters can be switched in on command, and individual experiments can be turned on and off as required. A number of secondary experiments was also included to measure particle fluxes, cosmic noise, and VLF emissions. (Author)

AD-626 651 **See Fld. 17/7**

AD-626 679 **See Fld. 4/1**

AD-626 935 **See Fld. 22/1**

AD-626 962 **See Fld. 3/2**

AD-627 017 **See Fld. 13/8**

AD-627 139 **See Fld. 11/2**

AD-627 140 **See Fld. 11/2**

22/3. SPACECRAFT TRAJECTORIES AND REENTRY

AD-627 192 Fld. 22/3, 22/1
RITCHIE INC DAYTON OHIO
A 'PREDICTOR' DISPLAY FOR ON-BOARD RENDEZVOUS OPTIMIZATION.
Final rept. Jan 64-Jun 65,
by George G. Frost, and William K. McCoy Jr.. Oct 65, 11p. Contract AF33 (615)-2353 Proj. AF-7184 Task 718402
AMRL TR-65-81

Unclassified report

Availability: Published in Proceedings of the National Electronics Conference v21 p683-8 1965. Copies to DDC users only.

Descriptors: (*Rendezvous trajectories, Display systems), (*Display systems, Rendezvous trajectories), Optimization, Control systems, Spacecraft docking, Simulation

To date the predictor concept has been shown to have great promise as a rendezvous display technique. It was shown that, provided the model is sufficiently good and the input data are sufficiently good, operators can rapidly be trained to fly successful rendezvous missions. It was shown that with the addition of two simple off-line or trial controls, operators can determine a near-optimum trajectory and implement that trajectory for near minimum fuel consumption. Additional work is in progress to determine how good the input data and the model must be, or conversely, how poor they can be without degrading the effectiveness of the system. Additional work is needed to determine display devices other than CRT's that might be applicable to the predictor display and to determine how the prediction computer might be miniaturized. Tentative plans in both of these areas are being formulated. (Author)

AD-626 862 **See Fld. 20/11**

AD-626 880 **See Fld. 20/9**

AD-626 935 **See Fld. 22/1**

AD-627 095 **See Fld. 22/2**

22/4. SPACECRAFT LAUNCH VEHICLES AND GROUND SUPPORT

AD-626 765 Fld. 22/4, 21/8.1
CFSTI Prices: HC $7.00 MF $1.75
AEROJET-GENERAL CORP SACRAMENTO CALIF
GEMINI STABILITY IMPROVEMENT PROGRAM (GEMSIP). VOLUME VI. INSTRUMENTATION.
Final rept.
31 Aug 65, 363p. Rept. no. GEMSIP-FR-1-Vol-6
Contract AF04 (695)-517
SSD TR-66-2-Vol-6

Unclassified report

Descriptors: (*Launch vehicles (Aerospace), Combustion), (*Combustion, Stability), (*Combustion chambers, Instrumentation), Temperature sensitive elements, Rocket motors (Liquid propellant), Fuel systems, Fuel injectors, Baffles, Fluid mechanics, Transducers, High frequency, Captive tests

The Gemini Stability Improvement Program (GEMSIP) was undertaken to provide a dynamically stable injector for the Stage II Gemini engine to improve the prospects for pilot safety and mission success. The criterion for dynamic stability was that the injector continue to operate stably after pulsing with explosive changes in the thrust chamber and with acoustic shocks in the feed system. This was accomplished and demonstrated by a series of 72 engine tests. Improvements were made in injector fabrication. Advanced fabrication techniques were investigated that are applicable to many aerospace components. Improvements were made in high frequency instrumentation, particularly in regard to cooled combustion chambers. Two unique pressure sensing methods were investigated and improved. A data processing system was developed for handling and analyzing large amounts of high frequency data. Experimental

methods were developed for direct measurement of gas side wall temperatures and improvements were made in pulsing techniques. In combustion theory the Sensitive Time Lag Theory was extended to nonlinear conditions and generalized. An improved method was developed for predicting altitude performance. (Author)

AD-626 766 Fld. 22/4, 21/8.1
CFSTI Prices: HC $6.00 MF $1.25
AEROJET-GENERAL CORP SACRAMENTO CALIF
GEMINI STABILITY IMPROVEMENT PROGRAM (GEMSIP). VOLUME III. ANALYTICAL MODEL.
Final rept.
31 Aug 65, 204p. Rept. no. GEMSIP-FR-1-Vol-3
Contract AF04 (695)-517
SSD TR-65-2-Vol-3

Unclassified report

See also AD-626 675.

Descriptors: (*Launch vehicles (Aerospace), Combustion), (*Combustion, Stability), Rocket motors (Liquid propellant), Fluid mechanics, Mathematical models, Fuel systems, Fuel injectors, Baffles, Time-lag theory, Combustion chambers

The Gemini Stability Improvement Program (GEMSIP) was undertaken to provide a dynamically stable injector for the Stage II Gemini engine to improve the prospects for pilot safety and mission success. The criterion for dynamic stability was that the injector continue to operate stably after pulsing with explosive changes in the thrust chamber and with acoustic shocks in the feed system. This was accomplished and demonstrated by a series of 72 engine tests. Improvements were made in injector fabrication. Advanced fabrication techniques were investigated that are applicable to many aerospace components. Improvements were made in high frequency instrumentation, particularly in regard to cooled combustion chambers. Two unique pressure sensing methods were investigated and improved. A data processing system was developed for handling and analyzing large amounts of high frequency data. Experimental methods were developed for direct measurement of gas side wall temperatures and improvements were made in pulsing techniques. In combustion theory the Sensitive Time Lag Theory was extended to nonlinear conditions and generalized. An improved method was developed for predicting altitude performance. (Author)

AD-626 767 Fld. 22/4, 21/8.1
CFSTI Prices: HC $7.70 MF $2.00
AEROJET-GENERAL CORP SACRAMENTO CALIF
GEMINI STABILITY IMPROVEMENT PROGRAM (GEMSIP). VOLUME II. DEVELOPMENT TEST PROGRAM.
Final rept.
31 Aug 65, 466p. Rept. no. GEMSIP-FR-1-Vol-2
Contract AF04 (695)-517
SSD TR-66-2-Vol-2

Unclassified report

See also AD-626 768.

Descriptors: (*Launch vehicles (Aerospace), Combustion), (*Combustion, Stability), (*Captive tests, Launch vehicles (Aerospace)), Rocket motors (Liquid propellant), Combustion chambers, Fuel systems, Fuel injectors, Baffles, Instrumentation, Experimental data

The report is devoted to an intensive review of the full-scale test firing portion of the program--the preparation of test plans, design and fabrication of test hardware, the testing, and the interpretation of test data. Also included in this volume are those nonfiring tests that were conducted with full-scale hardware for obtaining specific injector parameters necessary for reducing the hot-firing data.

AD-626 768 Fld. 22/4, 21/8.1
CFSTI Prices: HC $5.00 MF $1.00
AEROJET-GENERAL CORP SACRAMENTO CALIF
GEMINI STABILITY IMPROVEMENT PROGRAM (GEMSIP). VOLUME I. SUMMARY.
Final rept.
31 Aug 65, 192p. Rept. no. GEMSIP-FR-1-Vol-1
Contract AF04 (695)-517
SSD TR-66-2-Vol-1

Unclassified report

Descriptors: (*Launch vehicles (Aerospace), Combustion), (*Combustion, Stability), Rocket motors, Combustion chambers, Fuel injectors, Baffles, Timelag theory, Temperature sensitive elements, Instrumentation, High frequency, Captive tests, Performance (Engineering)

The Gemini Stability Improvement Program (GEMSIP) was undertaken to provide a dynamically stable injector for the Stage II Gemini engine to improve the prospects for pilot safety and mission success. The criterion for dynamic stability was that the injector continue to operate stably after pulsing with explosive changes in the thrust chamber and with acoustic shocks in the feed system. This was accomplished and demonstrated by a series of 72 engine tests. Improvements were made in injector fabrication. Advanced fabrication techniques were investigated that are applicable to many aerospace components. Improvements were made in high frequency instrumentation, particularly in regard to cooled combustion chambers. Two unique pressure sensing methods were investigated and improved. A data processing system was developed for handling and analyzing large amounts of high frequency data. Experimental methods were developed for direct measurement of gas side wall temperatures and improvements were made in pulsing techniques. In combustion theory the Sensitive Time Lag Theory was extended to nonlinear conditions and generalized. An improved method was developed for predicting altitude performance. (Author)

AD-626 769 Fld. 22/4, 21/8.1
CFSTI Prices: HC $6.00 MF $1.25
AEROJET-GENERAL CORP SACRAMENTO CALIF
GEMINI STABILITY IMPROVEMENT PROGRAM (GEMSIP). VOLUME IV. BAFFLE DESIGN STUDIES.
Final rept.
31 Aug 65, 255p. Rept no. GEMSIP-FR-1-Vol-4
Contract AF04 (695)-517
SSD TR-66-2-Vol-4

Unclassified report

Descriptors: (*Launch vehicles (Aerospace), Combustion), (*Combustion, Stability), (*Rocket motors (Liquid propellant), Baffles), Combustion chambers, Fuel systems, Fuel injectors, Design, Heat transfer, Cooling, Fluid mechanics, Thermodynamics, Captive tests

The report is concerned with the design analyses performed in order to design a cooled baffle for the GEMSIP injector configuration. Section I covers the design and testing of a water cooled baffle from which local hydraulic and heat flux measurements were obtained from the interior of a Titan combustion chamber while firing. Section II presents the heat transfer analyses based upon the data obtained from the water cooled baffle. Parametric studies relate gas side wall temperatures, coolant velocity and pressure drop for different baffle shapes, tube spacing, and wall thickness. From these studies are drawn design data for three different cooled baffle concepts. Section III discusses the design of a composite baffle made from copper with a protective covering which has improved heat conduction characteristics. This permits designing for lower coolant velocity with attendant decrease in the required differential pressure. The design principle has application also for other purposes where high heat flux is a problem. Included is a discussion of currently practicable fabrication procedures for such a baffle. Section IV is a report describing the development of improved steady state onedimensional momentum and energy equations with special application to rocket chamber tubes, manifolds, and injector baffles. Special attention is paid to the effects of channel curvature and dimensional changes on local wall temperatures and pressure losses.

AD-626 845 Fld. 22/4, 16/1
CFSTI Prices: HC $2.00 MF $0.50
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
SOVIET LAUNCH-VEHICLE TESTS IN THE PACIFIC OCEAN: COMPREHENSIVE REPORT.
Rept. no. 7 on ATD work assignment no. 57.
by W. Hrubiak. 30 Dec 65, 43p. Rept. no. atd-65-83
TT 66-60295

Unclassified report

Based on Soviet open literature pub. in connection with the Soviet launch-vehicle tests carried out in the Pacific Ocean Jan 1960-Jan 1965. Rept. on Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Launch vehicles (Aerospace), Tests), (*Guided missile launchers, Tests), Pacific Ocean, USSR, Launching, Spacecraft, Guidance, Tracking, Ships, Radar antennas, Rockets

The report consists of three sections: (A) Summary and analyst's discussion, (B) Analysis of the scope of the Pacific Ocean Tests, and (C) Translations of TASS news releases. Section A contains a summary of these tests in tabular form, together with a Mercator projection of the test areas. The table includes announcement dates, test dates, geographical location of each test area, distances between the launch and impact points, if given, and descriptions of rockets launched. Data in the table correspond directly to TASS releases and to the Mercator projection showing the locations and dimensions of the test areas. The analyst has divided Soviet Pacific Ocean tests into three basic groups. The first group includes tests conducted between 20 January and 8 July 1960 (to determine reliability and accuracy of the guidance system, measuring instruments, and communications equipment). The second group of tests was conducted in 1961 and 1962 during which time a new type of rocket was introduced. The last group of tests starts with Test Series V1, announced on 29 November 1963. The analyst conjectures that with this series the Soviets started testing some recoverable and reuseable versions of ugch v hicle which will be u ed to launch heavy spacecraft into Earth orbit, as well as sections of space stations to be assembled in orbit. There are 47 references. (Author)

AD-626 935 **See Fld. 22/1**

How To Use Indexes To TAB Portion Of

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS

SUBJECT INDEX

The Subject Index is arranged alphabetically by asterisked descriptors from the document announcements in the TAB. Each announcement contains one or more asterisked descriptors which identify the main subjects of the report. The asterisked descriptor may or may not have a modifying descriptor appearing directly below the asterisked descriptor. Under each descriptor entry in the Subject Index appear the following items of information: annotation, AD number, and field/group. A typical subject index entry is shown below.

*ALUMINUM
GLASS TEXTILES
INVESTIGATION OF GLASS-
METAL COMPOSITE MATERIALS
AD-619 773 FLD. 11/7

PERSONAL AUTHOR INDEX

The Personal Author Index is arranged alphabetically by the last names of the authors of reports. When several report entries are given for one author, the entries are arranged numerically by AD number. Field/group and titles are also listed. Three asterisks serve as a separator between entries for reports under the same author. A typical personal author entry is shown below.

*CHASE, JOHN W.
* * *
THE LANTHANUM, EUROPIUM,
AND DYSPROSIUM CONTENTS OF
TWO TEKTITES
AD-619 828 FLD. 8/7
* * *
A PROCEDURE FOR GEOCHEMICAL
INTERPRETATION OF TERRESTRIAL
RARE-EARTH ABUNDANCE PATTERNS
AD-619 834 FLD. 8/7

CORPORATE AUTHOR-MONITORING AGENCY INDEX

The Corporate Author-Monitoring Agency Index is arranged alphabetically by corporate authors and monitoring agencies.

In the corporate author entry for each document are listed the originator of the report, the originator's report number, the title, AD number, and field/group. If the source has listed a monitoring agency in the report, the monitor acronym and monitor series number are given in parenthesis directly under the title. An IDEP (Interservice Data Exchange Program) report number is presented in the same way. A typical corporate author entry is shown on the next page.

307-794 O - 66 - 7

*AEROJET- GENERAL CORP AZUSA
CALIF

* * *

TR3015
STUDY OF THE REACTION
OF PENTABORANE WITH HYDRAZINE
AND SUBSTITUTED HYDRAZINES
(AFOSR 65-1058)
AD-619 513 FLD. 7/4

The three asterisks serve as a separator between entries for reports under the same corporate author.

When a report lists a monitoring agency, a corresponding entry is provided under the name of the monitoring agency, which appears in alphabetical order among the corporate author entries. In a monitoring agency entry, the report number is given above the title in place of the originator's report number. A typical monitoring agency entry is shown below.

*AIR FORCE OFFICE OF SCIENTIFIC
RESEARCH WASHINGTON D C

* * *

65-1058
STUDY OF THE REACTION
OF PENTABORANE WITH HYDRAZINE
AND SUBSTITUTED HYDRAZINES
AD-619 513 FLD. 7/4

CONTRACT INDEX

The Contract index is arranged alphanumerically by contract number. Within a contract grouping, each entry contains corporate author, series number (if any), monitor number (if any), AD number, and field/group.

When there are multiple document entries under one contract number, entries are arranged by AD number under each corporate author represented.

A contract entry may also contain a letter F, A, or S on the left-hand margin, indicating that the document is a Final, Annual, or Summary report. A typical contract entry is shown below.

*AF19 628 5167
LINCOLN LAB MASS INST OF TECH
LEXINGTON
(ESD TDR-65-315)
AD-619 580 FLD. 9/5
(ESD TDR-65-309)
AD-619 708 FLD. 3/1

REPORT NUMBER INDEX

The Report Number Index lists identifying numbers assigned either by the document originators or by the sponsors of the work described in the documents. The AD number and field/group location in TAB are given for each report number. If both the originator and the sponsor of a document have assigned identifying numbers, listings for both will appear in the respective alphanumeric positions.

In certain cases accession numbers are also given with the corresponding AD numbers and TAB locations; for instance, the IDEP (Interservice Data Exchange Program) reports and the CFSTI-TT reports (Technical Translations from the Clearinghouse for Federal Scientific and Technical Information).

CCL-183	
AD-620 154	FLD. 11/9
CRSR-203	
AD-620 250	FLD. 3/1
DPS-1677	
AD-469 558	FLD. 19/1A

AD-FIELD INDEX

The AD-Field Index is arranged numerically by AD number and lists the field/group where the full entry can be located in TAB.

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The fields/groups indicated here apply only to the Technical Abstract Bulletin Section (on white paper).

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AD-626 837 FLD. 6/16
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AD-626 838 FLD. 6/16
PODOCYTES, RE-EXAMINED; STEREOLOGY OF HUMAN RENALGLOMERULUS; AND OBSERVATIONS ON KIDNEYS OF DESERTAND SWAMP ANIMALS.
AD-626 840 FLD. 6/16

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•ARPA ORDER-183-62
COLORADO UNIV BOULDER DEPT OF ELECTRICAL ENGINEERING
AD-626 801 FLD. 20/14

•ARPA ORDER-189-61
RAND CORP SANTA MONICA CALIF
RM-4760-ARPA
AD-626 946 FLD. 18/3

•ARPA ORDER-193-64
GEOLOGICAL SURVEY DENVER COLO
AD-626 834 FLD. 8/11

•ARPA ORDER-273
AERONUTRONIC DIV PHILCO CORP NEWPORT BEACH CALIF
U-3202
AD-626 726 FLD. 4/1

•ARPA ORDER-285-62-AMS
NAVAL ORDNANCE TEST STATION CHINA LAKE CALIF
NOTS-TP-3999
(NAVWEPS-9015)
AD-626 925 FLD. 7/3

•ARPA ORDER-292
LAMONT GEOLOGICAL OBSERVATORY PALISADES N Y
SCIENTIFIC-4
(AFCRL-65-909)
AD-626 695 FLD. 8/11

•ARPA ORDER-292-62
SAINT LOUIS UNIV MO INST OF TECH
(AFCRL-65-829)
F AD-627 038 FLD. 8/11

•ARPA ORDER-299
MONSANTO RESEARCH CORP EVERETT MASS BOSTON LAB
MRB-300996
AD-626 937 FLD. 7/5

•ARPA ORDER-306
LINDE DIV UNION CARBIDE CORP INDIANAPOLIS IND
SRC-66-3
AD-627 149 FLD. 20/2
UNITED AIRCRAFT CORP EAST HARTFORD CONN RESEARCH LABS
UACRL-E920272-6
AD-627 233 FLD. 20/5

•ARPA ORDER 306-20
AMERICAN OPTICAL CO SOUTHBRIDGE MASS RESEARCH DIV
AD-626 743 FLD. 20/5

•ARPA ORDER-306-62
LINDE DIV UNION CARBIDE CORP INDIANAPOLIS IND
SRCR-66-2
AD-627 148 FLD. 20/2

•ARPA ORDER-624
UED EARTH SCIENCES DIV TELEDYNE INC ALEXANDRIA VA
SEISMIC DLR-132
AD-627 039 FLD. 8/11
SEISMIC-DLR-131
AD-627 040 FLD. 8/11
130
AD-627 091 FLD. 8/11

•AT(11-1)-794
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMISTRY
(AROD-2397:6)

AD-626 784 FLD. 7/3

•AT(11-1)-1198
ILLINOIS UNIV URBANA DEPT OF PHYSICS
AD-627 180 FLD. 20/12

•AT(11-1)-GEN-10
CALIFORNIA UNIV LOS ANGELES DEPT OF ENGINEERING
AD-627 163 FLD. 9/2

•AT(49-2)-1167
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
USNRDL-TR-939
AD-627 026 FLD. 20/8
USNRDL-TR-943
AD-627 027 FLD. 20/8

•AT(49-5)-2084
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
USNRDL-TR-924
AD-627 029 FLD. 7/2

•CWB-7909
CALIFORNIA UNIV LOS ANGELES INST OF GEOPHYSICS AND PLANETARY PHYSICS
(AFCRL-TR-65-229)
AD-626 729 FLD. 4/1

•DA-01-021-AMC-12396(Z)
AUBURN UNIV ALA
AD-626 805 FLD. 7/2

•DA-04-200-ORD-171
BRITISH COLUMBIA UNIV VANCOUVER DEPT OF MATHEMATICS
(AROD-362:72)
AD-627 103 FLD. 12/1

•DA-19-129-AMC-1(N)
PILLSBURY MILLS INC MINNEAPOLIS MINN
F AD-627 091 FLD. 6/8

•DA-22-079-ENG-262
WILSON HUTTALL RAIMOND ENGINEERS INC CHESTERTOWN MD
(AEWES-CR-3-130)
F AD-626 993 FLD. 8/13

•DA-22-079-ENG-373
UNITED RESEARCH SERVICES CORP BURLINGAME CALIF
(AEWES-CR-3-91)
AD-627 079 FLD. 8/13

•DA-27-921-ENG-8
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
CRREL-TR-134
AD-627 043 FLD. 8/13

•DA-28-043-AMC-00073(E)
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
R-260
AD-627 076 FLD. 9/9
AD-627 094 FLD. 14/2

•DA-28-043-AMC-00145(E)
COMMUNICATION SYSTEMS INC PARAMUS N J
CSI-65-TR-773
F AD-626 905 FLD. 9/4

•DA-28-043-AMC-00379(E)
ELECTRONIC DEFENSE LABS SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF
EDL-M810
AD-627 242 FLD. 20/6

•DA-28-043-AMC-00406(E)
METEOROLOGY RESEARCH INC ALTADENA CALIF
AD-627 147 FLD. 4/2

•DA-28-043-AMC-00469(E)
VARIAN ASSOCIATES BEVERLY MASS QUANTUM ELECTRONICS DIV
AD-627 034 FLD. 9/1

•DA-28-043-AMC-00466(E)
CITY COLL RESEARCH FOUNDATION NEW YORK
AD-626 839 FLD. 9/3

•DA-28-043-AMC-01493(E)
RADIO CORP OF AMERICA SOMERVILLE N J ELECTRONIC COMPONENTS AND DEVICES
(ECOM-01493-1)
AD-627 063 FLD. 9/1

•DA-28-043-AMC-01501(E)
RCA LABS DIV RADIO CORP OF AMERICA PRINCETON N J
(ECOM-01501-1)
AD-626 775 FLD. 20/3

•DA-28-043-AMC-01550(E)
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
(ECOM-01550-1)
AD-626 829 FLD. 20/12

•DA-30-069-AMC-539(A)
INSTITUTE OF OPTICS UNIV OF ROCHESTER N Y
AD-626 844 FLD. 20/6

•DA-31-124-ARO(D)-31
MATHEMATICA PRINCETON N J
(AROD-4087:3)
AD-627 193 FLD. 12/2

•DA-31-124-ARO(D)-56
POLYTECHNIC INST OF BROOKLYN N Y
(AROD-2428:9)
F AD-627 134 FLD. 12/1

•DA-31-124-ARO(D)-114
ILLINOIS UNIV URBANA
(AROD-431:69)
AD-626 918 FLD. 20/3

•DA-31-124-ARO(D)-136
LAMONT GEOLOGICAL OBSERVATORY PALISADES N Y
(AROD-4120:3)
AD-627 131 FLD. 8/11

•DA-31-124-ARO(D)-182
TULANE UNIV NEW ORLEANS LA DEPT OF CHEMISTRY
(AROD-4375:6)
AD-626 924 FLD. 7/3

•DA-31-124-ARO(D)-253
NEW YORK UNIV N Y LAB FOR ELECTROSCIENCE RESEARCH
TR-400-125
(AROD-4949:3)
F AD-627 240 FLD. 9/4

•DA-31-124-ARO(D)-380
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
PIBMRI-1279-65
(AROD-5978:1)
AD-626 843 FLD. 5/7

•DA-33-017-CIVENG-57-27
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
SRS-164
F AD-626 995 FLD. 13/13
SRS-163
F AD-627 177 FLD. 13/13

•DA-33-017-ENG-96
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
AD-626 994 FLD. 13/3

•DA-33-017-ENG-221
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
AD-627 061 FLD. 13/3

•DA-33-017-ENG-295
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
AD-626 988 FLD. 13/3
AD-626 989 FLD. 13/3

•DA-36-039-AMC-01473(E)
API INSTRUMENTS CO CHESTERLAND OHIO
AD-626 760 FLD. 14/2

•DA-36-039-AMC-03200(E)
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF ELECTRICAL ENGINEERING
AD-626 912 FLD. 20/3
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
AD-626 662 FLD. 20/6
AD-626 663 FLD. 13/8

•DA-36-039-AMC-03622(E)
GENERAL INSTRUMENT CORP DARLINGTON S C CAPACITOR DIV
AD-627 137 FLD. 9/1

•DA-36-039-AMC-03632(E)
TEXAS INSTRUMENTS INC DALLAS
TI-03-65-118
AD-626 661 FLD. 9/1

•DA-36-039-AMC-06167(E)
MCCOY ELECTRONICS CO MOUNT HOLLY SPRINGS PA
AD-626 859 FLD. 9/1

•DA-36-AMC-06163(E)
TRW SEMICONDUCTORS INC LAWNDALE CALIF RESEARCH AND DEVELOPMENT DEPT
AD-626 849 FLD. 9/1

•DA-44-009-AMC-930(T)
HOLMAN (JOHN F) CO INC WASHINGTON D C
(AERDL-T-1811-65)
AD-626 821 FLD. 7/3
(AERDL-T-1812-65)
AD-626 822 FLD. 20/6
(AERDL-T-1814)
AD-627 098 FLD. 21/7

•DA-44-009-ENG-4830
DELAWARE UNIV NEWARK
F AD-627 083 FLD. 10/2

•DA-44-188-ARO-2
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
AD-627 214 FLD. 5/10

•DA-44-146-XZ-292
EDGERTON GERMESHAUSEN AND GRIER INC SANTA BARBARA CALIF
AD-627 077 FLD. 18/4

•DA-44-193-MD-2094
CINCINNATI UNIV OHIO COLL OF MEDICINE
A AD-627 050 FLD. 6/5

•DA-44-193-MD-2228
NORTH SHORE HOSPITAL MANHASSET N Y
F AD-627 062 FLD. 6/1

•DA-44-193-MD-2270
CHICAGO MEDICAL SCHOOL ILL
F AD-626 840 FLD. 6/16
CHICAGO MEDICAL SCHOOL ILL DEPT OF ANATOMY
AD-626 837 FLD. 6/16
AD-626 838 FLD. 6/16

•DA-44-193-MD-2281
IIT RESEARCH INST CHICAGO ILL
IITRI-L6021-5
AD-627 244 FLD. 6/3

•DA-49-193-MD-2387
BAYLOR UNIV HOUSTON TEX COLL OF MEDICINE
AD-626 918 FLD. 6/5

•DA-49-193-MD-2533
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF NUTRITION AND FOOD SCIENCE
AD-627 191 FLD. 6/13
AD-627 194 FLD. 6/6
AD-627 195 FLD. 6/6

•DA-AMC-36-039-63-G1
WASHINGTON UNIV SEATTLE DEPT OF ATMOSPHERIC SCIENCES
AD-626 900 FLD. 4/2

•DA-ARO-49-092-64-G29
SAO PAULO UNIV (BRAZIL) SCHOOL OF MEDICINE OF RIBEIRAO PRETO
AD-627 055 FLD. 6/1

•DA-ARO-49-092-64-G56
UNIVERSIDAD DE LOS ANDES BOGATA (COLOMBIA) FACULTAD DE ARTES Y CIENCIAS
AD-627 056 FLD. 6/5

•DA-ARO(D)-31-124-G70
POLYTECHNIC INST OF BROOKLYN N Y (AROD-2428:9)
F AD-627 134 FLD. 12/1

•DA-ARO(D)-31-124-G83
CALIFORNIA UNIV BERKELEY (AROD-362:45)
AD-627 118 FLD. 12/1
(AROD-362:69)
AD-627 122 FLD. 12/1
(AROD-362:70)
AD-627 125 FLD. 12/1
(AROD-362:71)
AD-627 129 FLD. 12/1

•DA-ARO(D)-31-124-G409
DUKE UNIV DURHAM N C DEPT OF CHEMISTRY
(AROD-3581:14)
AD-626 665 FLD. 7/3
(AROD-3581:15)
AD-626 666 FLD. 7/3
(AROD-3581:16)
AD-626 667 FLD. 7/3
(AROD-3581:17)
AD-626 686 FLD. 7/3

•DA-ARO(D)-31-124-G476
CALIFORNIA UNIV BERKELEY (AROD-362:62)
AD-627 104 FLD. 12/1

•DA-ARO(D)-31-124-G548
CALIFORNIA UNIV BERKELEY (AROD-362:67)
AD-627 109 FLD. 12/1
(AROD-362:73)
AD-627 114 FLD. 12/1
(AROD-362:74)
AD-627 115 FLD. 12/1
(AROD-362:68)
AD-627 116 FLD. 12/1

•DA-ARO(D)-31-124-G603
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMISTRY
(AROD-2397:6)
AD-626 784 FLD. 7/3

•DA-ARO(D)-31-124-G685
CONNECTICUT UNIV STORRS DEPT OF PHYSICS
(AROD-2805:17)
AD-626 783 FLD. 20/8

•N600(61533)61992
WESTINGHOUSE ELECTRIC CORP LIMA OHIO AEROSPACE ELECTRICAL DIV
AD-626 858 FLD. 10/2

•N61339-1907
SYLVANIA ELECTRONIC SYSTEMS-EAST NEEDHAM MASS (NTDC-1907-1)
F AD-627 099 FLD. 12/2

•NBS-CST-7348
COLORADO UNIV BOULDER DEPT OF ELECTRICAL ENGINEERING
AD-626 801 FLD. 20/14

•NBY-32280
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF TN-N-773
AD-627 082 FLD. 13/13

•NBY-53160
FRITZ ENGINEERING LAB LEHIGH UNIV BETHLEHEM PA FRITZ REPRINT-287
AD-626 881 FLD. 13/13

•NOBS-90278
CORNELL AERONAUTICAL LAB INC BUFFALO N Y CAL-BB-1939-S-1
F AD-627 035 FLD. 13/10

•NOBS-92930
AUTOMATION INDUSTRIES INC BOULDER COLO RESEARCH DIV TR-66-3
AD-627 231 FLD. 13/8

•NOBS-94092
FRITZ ENGINEERING LAB LEHIGH UNIV BETHLEHEM PA FRITZ REPRINT-287
AD-626 881 FLD. 13/13

•NOBSR-93365
RADIO CORP OF AMERICA SOMERVILLE N J ELECTRONIC COMPONENTS AND DEVICES
AD-627 178 FLD. 9/1

•NONR-220(47)
CALIFORNIA INST OF TECH PASADENA
AD-626 876 FLD. 20/8

•NONR-222(37)
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF LMSC-6-76-66-1
AD-626 761 FLD. 12/1

•NONR-222(83)
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY ORC-65-32
AD-626 728 FLD. 12/2

•NONR-225(67)
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF HEPL-393
AD-626 683 FLD. 20/8
HEPL-394
AD-626 684 FLD. 20/8

•NONR-225(78)
MICROWAVE LAB STANFORD UNIV CALIF ML-1399
AD-626 670 FLD. 20/12

•NONR-226(89)
COLUMBIA UNIV NEW YORK COLL OF PHYSICIANS AND SURGEONS
AD-626 872 FLD. 6/3

•NONR-233(94)
CALIFORNIA UNIV LOS ANGELES DEPT OF PHYSICS TR-P-71
AD-626 656 FLD. 20/8
P-72
AD-626 776 FLD. 9/2

•NONR-233(92)
CALIFORNIA UNIV LOS ANGELES DEPT OF ENGINEERING
AD-627 163 FLD. 9/2

•NONR-233(84)
CALIFORNIA UNIV LOS ANGELES DEPT OF PSYCHOLOGY TR-16
AD-626 669 FLD. 5/10
TR-17
AD-626 707 FLD. 5/10

•NONR-233(73)
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES WMSI WORKING PAPER-90
AD-627 143 FLD. 5/1

•NONR-233(78)
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES WMSI-29
AD-626 668 FLD. 12/1
WMSI WORKING PAPER-88
AD-627 142 FLD. 6/5
WMSI WORKING PAPER-91
AD-627 144 FLD. 5/1

•NONR-266(45)
COLUMBIA RADIATION LAB NEW YORK
AD-626 826 FLD. 7/4

•NONR-266(89)
COLUMBIA UNIV NEW YORK COLL OF PHYSICIANS AND SURGEONS
AD-626 871 FLD. 6/3
AD-626 873 FLD. 6/3
AD-626 874 FLD. 6/3

•NONR-375(14)
ELECTRICAL ENGINEERING RESEARCH LAB UNIV OF TEXAS AUSTIN EERL-138
AD-627 021 FLD. 8/14
EERL-139
AD-627 022 FLD. 9/2

•NONR-393(05)
HIGH ALTITUDE OBSERVATORY BOULDER COLO
AD-626 906 FLD. 4/1

•NONR-477(24)
WASHINGTON UNIV SEATTLE DEPT OF ATMOSPHERIC SCIENCES
AD-626 898 FLD. 4/2

•NONR-477(33)
WASHINGTON UNIV SEATTLE
AD-627 182 FLD. 5/10

•NONR-495(20)
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS 26
AD-626 759 FLD. 20/12

•NONR-551(36)
PENNSYLVANIA UNIV PHILADELPHIA DEPT OF PHYSICS
A AD-626 746 FLD. 20/3

•NONR-551(51)
PENNSYLVANIA UNIV PHILADELPHIA
AD-626 748 FLD. 7/4

•NONR-591(18)
RENSSELAER POLYTECHNIC INST TROY N Y
F AD-627 232 FLD. 20/2

•NONR-595(22)
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS BN-433
AD-627 189 FLD. 20/3

•NONR-656(12)
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF PHYSICS
AD-626 808 FLD. 7/4

•NONR-668(15)
ROCHESTER UNIV N Y
AD-626 745 FLD. 7/4

•NONR-669(18)
SYRACUSE UNIV N Y DEPT OF PHYSICS
AD-626 749 FLD. 20/5

•NONR-710(22)
HIGH ALTITUDE OBSERVATORY BOULDER COLO
AD-626 906 FLD. 4/1

•NONR-710(27)
MINNESOTA UNIV MINNEAPOLIS INST OF TECH
TR-8
AD-626 785 FLD. 20/13

•NONR-760(20)
CARNEGIE INST OF TECH PITTSBURGH PA DEPT OF PHYSICS
AD-626 744 FLD. 20/8

•NONR-760(24)
CARNEGIE INST OF TECH PITTSBURGH PA GRADUATE SCHOOL OF INDUSTRIAL ADMINISTRATION
MSRR-62
AD-626 982 FLD. 12/2

•NONR-1100(21)
JET PROPULSION CENTER PURDUE UNIV LAFAYETTE IND
JPC-413
AD-627 028 FLD. 20/13

•NONR-1141(12)
SYSTEMS RESEARCH CENTER CASE INST OF TECH CLEVELAND OHIO
SRC-81-A-65-31
AD-627 145 FLD. 12/2

•NONR-1202(17)
WISCONSIN UNIV MADISON DEPT OF STATISTICS
TR-53
AD-626 851 FLD. 12/1
TR-54
AD-626 852 FLD. 12/1
TR-56
AD-626 853 FLD. 12/1
TR-57
AD-626 854 FLD. 12/1

•NONR-1224(22)
COMMUNICATION SCIENCES LAB UNIV OF MICHIGAN ANN ARBOR
CSL-15
AD-626 659 FLD. 17/2

•NONR-1349(04)
STATE UNIV OF NEW YORK ALBANY RESEARCH FOUNDATION
F AD-626 855 FLD. 6/1

•NONR-1623(01)
NOTRE DAME UNIV IND
AD-627 081 FLD. 11/6

•NONR-1623(10)
NOTRE DAME UNIV IND DEPT OF METALLURGICAL ENGINEERING AND MATERIALS SCIENCE
TR-1
AD-626 879 FLD. 13/8

•NONR-1834(09)
ILLINOIS UNIV URBANA DEPT OF PHYSICS
AD-627 180 FLD. 20/12

•NONR-1841(93)
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MECHANICAL ENGINEERING
AD-627 198 FLD. 20/13

•NONR-1858(30)
PALMER PHYSICAL LAB PRINCETON UNIV N J
A AD-626 739 FLD. 3/2

•NONR-1858(37)
PRINCETON UNIV N J
AD-627 157 FLD. 14/2

•NONR-1866(10)
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS
AD-626 734 FLD. 20/12

•NONR-1866(19)
LYMAN LAB OF PHYSICS HARVARD UNIV CAMBRIDGE MASS
AD-626 823 FLD. 7/4
AD-626 824 FLD. 20/8

•NONR-1866(34)
HARVARD UNIV CAMBRIDGE MASS
AD-626 913 FLD. 18/11

•NONR-2119(04)
TEXAS A AND M UNIV COLLEGE STATION DEPT OF OCEANOGRAPHY AND METEOROLOGY
REF-65-34T
AD-626 809 FLD. 8/3

•NONR-2149(03)
VANDERBILT UNIV NASHVILLE TENN
TR-23
AD-626 751 FLD. 5/10
TR-24
AD-626 752 FLD. 5/10
TR-27
AD-626 753 FLD. 5/10

•NONR-2216(23)
SCRIPPS INSTITUTION OF OCEANOGRAPHY UNIV OF CALIFORNIA LA JOLLA
AD-626 825 FLD. 8/10
AD-626 875 FLD. 8/10
AD-627 160 FLD. 8/10

•NONR-2687(00)
PENNSALT CHEMICALS CORP WYNDMOOR PA RESEARCH AND DEVELOPMENT DEPT
TR-33
AD-627 060 FLD. 7/2

•NONR-2733(00)
J G ENGINEERING RESEARCH ASSOCIATES BALTIMORE MD
TR-14
AD-627 078 FLD. 20/1

•NONR-2797(00)
WARNER AND SWASEY OBSERVATORY CASE INST OF TECH CLEVELAND OHIO
F AD-627 185 FLD. 3/2

•NONR-3560(00)
AERONUTRONIC DIV PHILCO CORP NEWPORT BEACH CALIF
U-3202
AD-626 726 FLD. 4/1

•NONR-3623(00)
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MECHANICAL ENGINEERING
AD-627 168 FLD. 14/2

•NONR-3656(09)
CALIFORNIA UNIV BERKELEY DEPT OF PHYSICS
(AFOSR-65-1951)
AD-626 894 FLD. 20/8

•NONR-3656(26)
CALIFORNIA UNIV BERKELEY SPACE SCIENCES LAB
AD-626 672 FLD. 3/2

•NONR-3706(00)
MARTIN CO ORLANDO FLA MATERIALS RESEARCH LAB
OR-8000
AD-627 018 FLD. 20/12
OR-6899
AD-627 019 FLD. 20/11

•NONR-3710(03)
NEW HAMPSHIRE UNIV DURHAM
TR-2
AD-627 179 FLD. 5/9

•NONR-3829(00)
AMERICAN OPTICAL CO SOUTHBRIDGE MASS RESEARCH DIV
AD-626 743 FLD. 20/5

•NONR-3985(08)
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
R-260
AD-627 076 FLD. 5/9

•NONR-4004(00)
MATHEMATICA PRINCETON N J
(AROD-4087:3)
AD-627 193 FLD. 12/2

•NONR-4132(00)
LINDE DIV UNION CARBIDE CORP INDIANAPOLIS IND
SRCR-66-2
AD-627 148 FLD. 20/2

•NONR-4222(01)
CALIFORNIA UNIV SANTA BARBARA DEPT OF PHYSICS
TR-13
AD-626 671 FLD. 7/4

•NONR-4259(07)
COLUMBIA UNIV NEW YORK DEPT OF CIVIL ENGINEERING AND ENGINEERING MECHANICS
TR-29
AD-626 862 FLD. 20/11

•NONR-4311(00)
MONSANTO RESEARCH CORP EVERETT MASS BOSTON LAB
MRB-300986
AD-626 937 FLD. 7/5

•NONR-4562(00)
CALIFORNIA ANALYSIS CENTER INC SANTA MONICA
CACI-65-P2.0-1
A AD-627 088 FLD. 12/2

•NONR-4696(00)
UNITED AIRCRAFT CORP EAST HARTFORD CONN RESEARCH LABS
UACRL-E920272-6
AD-627 233 FLD. 20/5

•NONR-4793(00) (A-1)
LINDE DIV UNION CARBIDE CORP INDIANAPOLIS IND
SRC-66-3
AD-627 149 FLD. 20/2

•NONR-4972(00)
AUTONETICS ANAHEIM CALIF
AD-627 141 FLD. 9/5

•NONR-5012(00)
TORONTO UNIV (ONTARIO) DEPT OF PHYSICS
AD-626 747 FLD. 7/4

•NONR-5040(00)
J G ENGINEERING RESEARCH ASSOCIATES BALTIMORE MD
AD-626 800 FLD. 20/1

•NONR(G)-00037-65
QUEENS COLL OF THE CITY UNIV OF NEW YORK FLUSHING DEPT OF PHYSICS
TR-1
AD-626 787 FLD. 20/10

•NORD-7386
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
TG-328
AD-626 691 FLD. 17/7

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626 675	17/2.1	626 766	22/4	626 857	8/12	626 948	6/8
626 676	20/14	626 767	22/4	626 858	10/2	626 949	8/2
626 677	5/3	626 768	22/4	626 859	9/1	626 950	9/2
626 678	4/2	626 769	22/4	626 860	20/12	626 951	20/4
626 679	4/1	626 770	13/13	626 861	18/9	626 952	6/3
626 680	22/2	626 771	6/5	626 862	20/11	626 953	20/5
626 681	20/8	626 772	14/2	626 863	20/12	626 954	14/2
626 682	6/16	626 773	6/16	626 864	20/12	626 955	20/5
626 683	20/8	626 774	11/6	626 865	20/2	626 956	5/7
626 684	20/8	626 775	20/5	626 866	20/12	626 957	20/11
626 685	7/2	626 776	9/2	626 867	20/2	626 958	20/9
626 686	7/3	626 777	17/10	626 868	20/2	626 959	20/5
626 687	3/1	626 778	20/2	626 869	11/6	626 960	11/1
626 688	20/14	626 779	20/8	626 870	18/4	626 961	11/6
626 689	4/2	626 780	20/8	626 871	6/3	626 962	3/2
626 690	4/1	626 781	20/8	626 872	6/3	626 963	21/4
626 691	20/11	626 782	20/8	626 873	6/3	626 964	11/6
626 692	20/6	626 783	20/8	626 874	6/3	626 965	21/2
626 693	9/5	626 784	7/5	626 875	8/10	626 966	11/6
626 694	4/1	626 785	20/13	626 876	20/8	626 967	20/13
626 695	8/11	626 786	20/8	626 877	20/10	626 968	20/4
626 696	9/1	626 787	20/10	626 878	9/5	626 969	12/1
626 697	11/10	626 788	11/9	626 879	13/8	626 970	12/1
626 698	3/1	626 789	7/1	626 880	20/9	626 971	10/1
626 699	5/10	626 790	8/2	626 881	13/13	626 972	21/3
626 700	4/1	626 791	6/8	626 882	9/2	626 973	20/4
626 701	11/6	626 792	7/3	626 883	20/3	626 974	4/2
626 702	19/4	626 793	6/8	626 884	7/4	626 975	21/3
626 703	13/10	626 794	6/8	626 885	7/4	626 976	12/1
626 704	8/12	626 795	9/2	626 886	7/4	626 977	11/8
626 705	17/7	626 796	6/8	626 887	20/6	626 978	7/4
626 706	4/2	626 797	6/8	626 888	7/4	626 979	6/19
626 707	5/10	626 798	13/13	626 889	6/3	626 980	11/7
626 708	8/2	626 799	20/6	626 890	9/5	626 981	13/7
626 709	8/8	626 800	20/1	626 891	20/12	626 982	12/2
626 710	8/6	626 801	20/14	626 892	20/12	626 983	14/2
626 711	8/6	626 802	20/2	626 893	7/4	626 984	6/8
626 712	8/6	626 803	20/12	626 894	20/8	626 985	9/1
626 713	8/6	626 804	11/11	626 895	11/6	626 986	20/11
626 714	5/3	626 805	7/2	626 896	20/8	626 987	7/2
626 715	5/3	626 806	9/1	626 897	3/2	626 988	13/5
626 716	8/6	626 807	9/2	626 898	4/2	626 989	13/5
626 717	13/10	626 808	7/4	626 899	8/13	626 990	11/6
626 718	21/8.2	626 809	8/3	626 900	4/2	626 991	9/5
626 719	21/9.2	626 810	20/4	626 901	20/3	626 992	13/8
626 720	21/8.2	626 811	20/8	626 902	9/5	626 993	8/13
626 721	21/9.2	626 812	20/8	626 903	9/6	626 994	13/5
626 722	21/8.2	626 813	20/8	626 904	8/10	626 995	13/13
626 723	21/8.2	626 814	20/8	626 905	9/4	626 996	6/18
626 724	21/8.2	626 815	5/9	626 906	4/1	626 997	6/18
626 725	4/1	626 816	5/9	626 907	20/6	626 998	18/4
626 726	4/1	626 817	5/9	626 908	6/5	626 999	20/8
626 727	15/2	626 818	14/2	626 909	20/8	627 000	18/4
626 728	12/2	626 819	9/2	626 910	12/1	627 001	9/4
626 729	20/12	626 820	9/2	626 911	3/2	627 002	8/7
626 730	9/4	626 821	7/3	626 912	20/9	627 003	20/12
626 731	9/2	626 822	20/6	626 913	18/11	627 004	20/3
626 732	9/4	626 823	7/4	626 914	12/1	627 005	11/10
626 733	9/2	626 824	20/8	626 915	6/5	627 006	11/3
626 734	20/12	626 825	8/10	626 916	6/1	627 007	20/9
626 735	3/2	626 826	7/4	626 917	20/4	627 008	17/9
626 736	21/8.2	626 827	20/8	626 918	20/3	627 009	17/8
626 737	20/11	626 828	14/2	626 919	6/13	627 010	6/8
626 738	20/11	626 829	20/12	626 920	9/4	627 011	5/9
626 739	21/8.2	626 830	6/12	626 921	5/4	627 012	6/19
626 740	21/8.2	626 831	13/11	626 922	13/3	627 013	9/3

627 014	18/8
627 015	8/9
627 016	19/2
627 017	13/8
627 018	20/12
627 019	20/11
627 020	8/11
627 021	8/19
627 022	9/2
627 023	13/10
627 024	7/2
627 025	20/9
627 026	20/8
627 027	20/8
627 028	20/13
627 029	9/9
627 030	9/9
627 031	20/9
627 032	13/13
627 033	7/9
627 034	9/1
627 035	13/10
627 036	6/11
627 037	10/2
627 038	8/11
627 039	8/11
627 040	8/11
627 041	20/1
627 042	7/9
627 043	8/13
627 044	6/19
627 045	1/5
627 046	20/5
627 047	11/7
627 048	22/2
627 049	11/9
627 050	6/5
627 051	8/11
627 052	20/19
627 053	8/7
627 054	13/12
627 055	6/1
627 056	6/5
627 057	9/6
627 058	7/9
627 059	20/12
627 060	7/2
627 061	13/5
627 062	6/1
627 063	9/1
627 064	3/2
627 065	20/9
627 066	20/12
627 067	20/8
627 068	21/7
627 069	6/18
627 070	8/9
627 071	21/2
627 072	7/9
627 073	18/8
627 074	9/1
627 075	20/13
627 076	5/9
627 077	18/9
627 078	20/1
627 079	8/13
627 080	13/10
627 081	11/6
627 082	13/13
627 083	10/2
627 084	20/5
627 085	9/5
627 086	20/9
627 087	6/12
627 088	12/2
627 089	1/3
627 090	9/2
627 091	6/8
627 092	13/9
627 093	6/20
627 094	19/2
627 095	22/2
627 096	8/11
627 097	20/1
627 098	21/7
627 099	12/2
627 100	20/1
627 101	13/8
627 102	6/3
627 103	12/1
627 104	12/1
627 105	7/9
627 106	7/2
627 107	6/17
627 108	6/1
627 109	12/1
627 110	6/16
627 111	11/6
627 112	20/9
627 113	21/5
627 114	12/1
627 115	12/1
627 116	12/1
627 117	19/5
627 118	12/1
627 119	6/3
627 120	20/13
627 121	13/8
627 122	12/1
627 123	6/5
627 124	11/10
627 125	12/1
627 126	20/9
627 127	8/7
627 128	8/10
627 129	12/1
627 130	8/12
627 131	8/11
627 132	1/2
627 133	1/2
627 134	12/1
627 135	20/5
627 136	9/5
627 137	9/1
627 138	13/13
627 139	11/2
627 140	11/2
627 141	9/5
627 142	6/5
627 143	5/1
627 144	5/1
627 145	12/2
627 146	9/5
627 147	4/2
627 148	20/2
627 149	20/2
627 150	19/9
627 151	8/10
627 152	6/5
627 153	19/9
627 154	9/1
627 155	21/2
627 156	20/9
627 157	14/2
627 158	20/13
627 159	20/6
627 160	8/10
627 161	20/19
627 162	5/9
627 163	9/2
627 164	9/2
627 165	20/9
627 166	7/2
627 167	20/12
627 168	14/2
627 169	8/11
627 170	11/7
627 171	20/2
627 172	12/2
627 173	11/9
627 174	20/2
627 175	9/9
627 176	6/5
627 177	13/13
627 178	9/1
627 179	5/9
627 180	20/12
627 181	20/1
627 182	5/10
627 183	8/11
627 184	20/9
627 185	3/2
627 186	6/16
627 187	12/1
627 188	6/13
627 189	20/3
627 190	6/17
627 191	6/13
627 192	22/3
627 193	12/2
627 194	6/6
627 195	6/6
627 196	20/12
627 197	20/3
627 198	7/2
627 199	6/6
627 200	20/12
627 201	5/3
627 202	15/5
627 203	12/2
627 205	5/9
627 206	5/9
627 207	22/1
627 208	22/2
627 209	22/2
627 210	7/3
627 211	6/12
627 212	6/12
627 213	5/9
627 214	5/10
627 215	10/3
627 216	7/9
627 217	17/8
627 218	5/9
627 219	5/9
627 220	5/9
627 221	7/2
627 222	7/2
627 223	7/2
627 224	7/2
627 225	7/2
627 226	7/2
627 227	5/9
627 228	5/9
627 229	7/3
627 230	11/1
627 231	13/8
627 232	20/2
627 233	20/5
627 234	7/9
627 235	18/11
627 236	6/16
627 237	7/9
627 238	20/12
627 239	5/8
627 240	9/9
627 241	1/9
627 242	20/6
627 243	14/2
627 244	6/3
627 245	20/6
627 246	16/3
627 247	14/2
627 248	7/9
627 249	13/10
627 250	13/10
627 251	13/10
627 252	1/3
627 253	21/9.2
627 254	20/3
627 255	13/8
627 256	8/3
627 257	21/2
627 258	5/10
627 259	9/1
627 260	5/10
627 261	18/1
627 262	20/9

OTHER RESEARCH REPORTS AND RELATED MATERIAL

1. AERONAUTICS

AD-403 300 **Field 1B**
CFSTI Price: HC$1.00
Aviation Crash Injury Research, Phoenix, Ariz.
NEW TECHNIQUES FOR ASSESSING DAMAGE FROM ACCIDENT INVESTIGATION,
by Lee W. Gregg. Mar 63, 22p AvCIR-62-28
Contract DA-44-177-AMC-888 (T),
Task DA-1A024-701A12101
TRECOM TR-63-13

Descriptors: (*Aviation accidents, Damage), (*Crash injuries, Aviation accidents), Aviation safety, Applied psychology, Mathematical analysis, Impace shock, Test methods.

New techniques in assessing damage from aircraft accident investigations, including psychological, mathematical, and systems and communications engineering methods are briefly discussed. (Author)

AD-449 869 **Field 1A**
CFSTI Price: HC$1.00
Union Carbide Research Inst., Tarrytown, N. Y.
STAGNATION-POINT-VELOCITY DISTRIBUTION FOR A COMPRESSIBLE FLUID,
by R. A. Graff. Oct 64, 11p Technical rept. no. C-24
Contract DA-30-069-ORD-2787

Descriptors: (*Compressible flow, Stagnation point), (*Stagnation point, Velocity), Distribution, Flat plate models, Boundary layer, Perturbation theory, Subsonic flow, Differential equations.

The Rayleigh-Janzen method is applied to the potential flow of a compressible fluid impinging on a flat plate at right angles. An analytical expression for the velocity distribution is obtained up to the second perturbation. (Author)

AD-451 892 **Field 1A**
CFSTI Price: HC$2.00
ARO, Inc., Arnold Air Force Station, Tenn.
PRESSURE TESTS ON THE STANDARD HYPERVELOCITY BALLISTIC MODEL HB-2 AT MACH 1.5 TO 5,
by Jerry H. Jones. Nov 64, 30p
Contract AF40 (600)-1000,
Proj. ARO-VT3116
AEDC TDR-64-246

Descriptors: (*Supersonic test vehicles, Wind tunnel models), (*Wind tunnel models, Hypervelocity projectiles), Angle of attack, Reynolds number, Pressure, Aerodynamic configurations, Blunt bodies, Conical bodies, Tests.

Pressure tests were conducted on a standard hypervelocity ballistic model HB-2 in the 40 in. supersonic Tunnel A of the von Karman Gas Dynamics Facility. Data were obtained at Mach numbers 1.5, 3, and 5 at angles of attack of 0, 3, 5, 10, and 15 deg, and at Mach numbers 2 and 4 at zero angle of attack. Reynolds number, based on the centerbody diameter, ranged from 320,000 to 2,320,000. Pressure distributions are presented, and a comparison is made of force and moment coefficients obtained from integrated pressure data with results from previous force tests on this model.

AD-466 304 **Field 1A, 14B**
CFSTI Prices: HC$2.00 MF$0.50
California Univ., Berkeley. Inst. of Engineering Research.
MEASUREMENT OF SHOCK WAVE THICKNESS BY THE ELECTRON BEAM FLUORESCENCE METHOD,
by F. Robben and L. Talbot. May 65, 28p AS-65-4
Contract Nonr-222 (45), Grant AF-AFOSR-538-65
N65 29270

Descriptors: (*Shock waves, Thickness), Measurement, Electron beams, Fluorescence, Helium, Argon, Nitrogen, Wind tunnels, Jets, Superaerodynamics.

Shock wave thicknesses and density ratios were measured in helium, argon and nitrogen by means of the electron beam fluorescence method, over the range 1.5 less than M less than 17.4, in a low density wind tunnel. The shock thicknesses in argon and helium agreed well with Mott-Smith theory at the higher Mach numbers, and were between Navier-Stokes and Mott-Smith theory at the lowest Mach number. In nitrogen, the measured shock thicknesses were considerably greater than the predictions of Navier-Stokes theory. Measured density ratios across the shock wave were in good agreement with theory, in the lower density flows. Poorer agreement was found at higher flow densities, leading to estimates of upper bounds for the range of linear variation of fluorescence intensity with gas density. Measured density ratios for shocks produced in divergent free-jet flows were found to be in better agreement with theory after a viscous curvature correction was applied. (Author)

AD-466 553 **Field 1B, 11G**
CFSTI Prices: HC$3.00 MF$0.75
Snell (Foster D.), Inc., New York.
RAIN REPELLENT.
Final rept.
15 Jun 65, 72p
Contract NOw-64-0231-c

Descriptors: (*Antirain agents, Effectiveness), Windshields, Aircraft, Surface-active substances, Siloxanes, Metalorganic compounds, Titanium compounds, Polymers, Ammonium compounds, Amines, Surface tension, Measurement, Tables, Surface properties.

A rain repellent was developed for application during in-flight rain conditions. It has an improved spread and a good rain spray life. The repellent is supplied as a liquid concentrate containing 50 per cent active material in trichlorotrifluoroethane. Before use, the repellent concentrate can be diluted with trichlorotrifluoroethane or other suitable solvents to conform to the requirements of the application system.

AD-468 088 **Field 1B**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Test Center, Patuxent River, Md.
MODEL KC-130F AND OV-1B AIRCRAFT; AIR REFUELING FLIGHT COMPATIBILITY EVALUATION.
Final rept.,
by John D. Carlton. 2 Aug 65, 24p ST 31-61R-65
Task RA1300001

Descriptors: (*Tanker planes, Refueling in flight), (*Observation planes, Refueling in flight), Short takeoff planes, Transport planes, Indicator lights, Flight testing, Tests, Test methods, Compatibility, Corrections, Rendezvous guidance, Military training, Military requirements, Radio navigation, Ultrahigh frequency, Installation.

Identifiers: C-130 aircraft, OV-1 aircraft.

The OV-1B and KC-130F are compatible for air refueling when the KC-130F air refueling system is modified by incorporation of a high drag paradrogue canopy. The high drag paradrogue canopy utilized during this evaluation is suitable for service use. Successful probe-drogue engagements were made at airspeeds from 135 to 190 KIAS at altitudes varying from 5,000 to 15,000 ft. The optimum airspeeds and altitude for air refueling are 155 to 160 KIAS at 10,000 ft. Correction of the following deficiencies in the OV-1B is desirable for improved service use: low refueling transfer rate, inability of fuel quantity indicating system to indicate full fuel load with 300-gallon drop tanks installed, and lack of TACAN for tanker rendezvous. Army pilots flying the OV-1B participating in operational AR flights with the KC-130F must be qualified in formation flying, familiar with procedures outlined in the Air Refueling NATOPS Manual and this report, and certified to be qualified by an air refueling instructor pilot.

N65-35775 **Field 1B**
CFSTI Price: MF$1.25
National Aeronautics and Space Administration, Washington, D. C.
TWELFTH SEMIANNUAL REPORT TO CONGRESS, JULY 1-DECEMBER 31, 1964.
1965, 245p
Hard Copy Available from Superintendent of Documents, GPO, Washington, D. C., 20402, $1.00.

Descriptors: (*Aeronautics, Reports).

N65-35829 **Field 1C**
CFSTI Prices: HC$4.00 MF$1.00
Langley Station, Va. National Aeronautics and Space Administration, Langley Research Center.
EFFECT OF CONFIGURATION VARIABLES ON THE SUBSONIC LONGITUDINAL STABILITY CHARACTERISTICS OF A HIGH-TAIL TRANSPORT CONFIGURATION,
by Edward J. Ray and Robert T. Taylor. Oct 65, 127p NASA-TM-X-1165

Descriptors: (*Aerodynamic characteristics, Transport planes).

N65-35831 **Field 1C**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
INVESTIGATION OF A TWISTED CAMBERED WING WITH A 75 DEGREE SWEPT LEADING EDGE AT MACH 3 AND REYNOLDS NUMBERS TO 39 X 10 TO THE 6th POWER,
by John A. Moore. Oct 65, 25p NASA-TN-D-3031

Descriptors: (*Swept wings, Model tests).

N65-35835 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
Langley Station, Va. National Aeronautics and Space Administration, Langley Research Center.
EXPERIMENTAL FLUTTER STUDY OF A WINGFUSELAGE CONFIGURATION AT A MACH NUMBER OF 15.4 AND COMPARISON WITH THEORY,
by Robert C. Goetz and John L. Sewall. 1965, 47p NASA-TN-D-3046

Descriptors: (*Flutter, Wing-body configurations).

N65-36767 **Field 1A**
CFSTI Prices: HC$3.00 MF$0.75
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
MEASUREMENTS OF NONEQUILIBRIUM EFFECTS IN AIR ON WEDGE-FLAT-PLATE AFTERBODY PRESSURES,
by R. J. Vidal and F. Stoddard. Nov 65, 76p
Contracts NAS1-2812, AF49 (600)-928
NASA CR-328

Descriptors: (*Flat plate models, Nonequilibrium flow), (*Wedges, Afterbodies).

207-794 O - 66 - 14

N66-10330 **Field 1A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
A NUMERICAL METHOD FOR CALCULATING NEARFIELD SONIC-BOOM PRESSURE SIGNATURES.
Technical note,
by Wilbur D. Middleton and Harry W. Carlson.
Nov 65, 9p NASA-TN-D-3082

Descriptors: (*Sonic boom, Shock waves), (*Shock waves, Pressure).

N66-11252 **Field 1A, 20A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
A WIND-TUNNEL INVESTIGATION OF THE EFFECT OF BODY SHAPE ON SONIC-BOOM PRESSURE DISTRIBUTIONS.
Technical note,
by Harry W. Carlson, Robert J. Mack, andOdell A. Morris. Nov 65, 32p NASA-TN-D-3106

Descriptors: (*Aerodynamic configurations, Sonic boom), (*Sonic boom, Pressure).

PB-169 031 **Field 1B**
CFSTI Prices: HC$2.00 MF$0.50
Systems Research and Development Service, Federal Aviation Agency, Washington, D. C.
INTERNATIONAL AVIATION RESEARCH AND DEVELOPMENT SYMPOSIUM (3rd). AGENDA.
Held 1-3 Nov 65, Atlantic City, N. J.
1965, 35p
See also PB-169 034.

Descriptors: (*Aeronautics, Symposia), Automation, Data processing systems, Systems engineering, Traffic, Tracking, Control.

PB-169 049 **Field 1D, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
SPEED TRIM BENCH TEST SET PART NO. A02E5882-1, A02E5882-3; STOCK NO. RX4920-075-1993-SVER, RX4920-908-1752-SVER (BOEING-VERTOL).
Technical manual instrument calibration procedures.
1 Nov 65, 22p NAVWEPS-17-20VET-2
Supersedes report no. NAVWEPS-17-20VET-2, dated 1 Oct 64.

Descriptors: (*Flight control systems, Test sets), (*Test sets, Calibration), Airspeed indicators, Attitude control systems, Instruction manuals, Test methods.

The manual covers the calibration of Speed Trim Bench Test Sets A02E5882-1 and A02E5882-3, manufactured by The Boeing Company, Vertol Division, Morton, Pa. The test instrument provides input signals, control circuits, and output loads for testing the speed trim amplifier and the preamplifier, servo amplifier, signal amplifier, and calibration cards. Control circuits are also provided for testing the DCP actuator and longitudinal cyclic trim actuator.

PB-169 095 **Field 1D**
CFSTI Prices: HC$3.00 MF$0.50
Tactair Fluid Controls Corp., Bridgeport, Pa.
DESIGN OF A LIGHT AIRPLANE STABILITY AUGMENTATION SAFETY SYSTEM.
Technical rept., phase 1,
by James E. Gasho, Harry W. Johnson andJames D. Reyner, Jr. Dec 63, 52p
Contract FA-WA-4512,
Proj. FA-540-007-01H
FAA-ADS 9

Descriptors: (*Flight control systems, Stabilization systems), (*Aviation safety, Flight control systems), Stability, Flight testing, Aircraft, Design, Automatic pilots, Handling, Flight instruments.

Identifiers: Stability augmentation safety systems.

The objective of the project is to design and build a light airplane stability augmentation safety system (SAS) to fulfill two requirements: (1) If manually selected by the pilot, SAS will have cruise-relief usefulness in preventing upsets due to pilot inattention or disorientation; and (2) if not manually selected, SAS will warn the pilot that he is approaching hazardous flight regimes and will automatically return the airplane to normal flight speeds and attitudes. A flight test program was conducted on a light single-engine low-wing airplane with recording instrumentation installed. The control force required to recover the airplane from various combinations to airspeed, rate of descent and bank angle to normal flight was determined. These data are tabulated as well as plotted and analyzed. The flight test data was used to design the stability augmentation safety system for the test airplane. The report presents the design of this system as based upon the use of airspeed and rate of descent sensors to either provide automatic activation of the system or warn the pilot, or both. (Author)

PB-169 096 **Field 1D**
CFSTI Prices: HC$2.00 MF$0.50
Tactair Fluid Controls Corp., Bridgeport, Pa.
DEVELOPMENT AND DEMONSTRATION OF A LIGHT AIRPLANE STABILITY AUGMENTATION SAFETY SYSTEM.
Technical rept., phase 2,
by James E. Gasho, Harry W. Johnson andJames D. Reyner, Jr. Feb 65, 40p
Contract FA-WA-4512,
Proj. FA-540-007-01H
FAA-ADS 10

Descriptors: (*Flight control systems, Stabilization systems), (*Aviation safety, Flight control systems), Stability, Flight testing, Aircraft, Automatic pilots, Handling, Design, Flight instruments.

Identifiers: Stability augmentation safety systems.

The report describes the laboratory and flight development and demonstration of a Stability Augmentation Safety System (SAS) based upon the design presented in PB-169 095. Laboratory development work on the automatic SAS activation principle was followed by development flight testing of the complete SAS. Sufficient instrumented flight tests were performed to define the profiles of SAS recoveries. It was demonstrated that SAS will provide automatic recoveries from dives entered due to pilot disorientation or inattention without exceeding the airplane's FAA-approved flight boundaries. The resulting performance characteristics also have considerable utility throughout the normal flight regime, approximating the performance of some contemporary autopilots, except for command features. SAS was qualified to the standard to TSO-C9c (AS 402A) and was granted FAA Supplementar Type Certificate SA270EA for installation in the test vehicle and operation within the limitations of the approved flight manual supplement. (Author)

PB-169 115 **Field 1A**
CFSTI Prices: HC$1.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
ON TAYLOR'S HYPOTHESIS IN WIND-TUNNEL TURBULENCE,
by C. C. Lin. 20 Feb 50, 9p NOLM-10775
Proj. NR-061-069
ATI 76 367

Descriptors: (*Wind tunnels, Turbulence), (*Turbulence, Wind tunnels), Approximation (Mathematics), Partial differential equations.

An estimation is made of the order of magnitude of the various terms in the equation for homogeneous and isotropic turbulence. This enables one to estimate the error involved in using Taylor's hypothesis, e.g., for the determination of the microscale of turbulence. The error is generally negligible. (Author)

2. AGRICULTURE

PB-169 103 **Field 2F**
CFSTI Prices: HC$1.00 MF$0.50
Forest Products Lab., Madison, Wis.
METHODS FOR ESTIMATING SPECIFIC GRAVITY OF LOGS.
Research note,
by Dimitri Pronin. Jan 66, 12p FPL-0110

Descriptors: (*Wood, Density), (*Forestry, Counting methods), Weight, Mathematical prediction.

A study and comparison of log specific gravity estimates obtained by some of the more common procedures with the actual specific gravity values determined by 100 percent measurement. The comparison is made for both total wood and for clear wood only. (Author)

3. ASTRONOMY AND ASTROPHYSICS

N65-35518 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
DATA REDUCTION FOR FILTER SPECTRORADIOMETRY,
by Ralph E. Wagoner and John L. Pollack. Oct 65, 18p NASA-TND-3037

Descriptors: (*Solar spectrum, Data), (*Radiometers, Spectroscopy).

PB-168 984 **Field 3B**
CFSTI Prices: HC$2.00 MF$0.50
Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
THE ROTATION OF THE PLANET MERCURY.
Special rept. on Research in Space Science,
by Giuseppe Colombo and Irwin I. Shapiro. 15 Nov 65, 27p SAO-SR-188R
Grant NsG-87-60

Descriptors: (*Mercury (Planet), Rotation), (*Celestial mechanics, Mercury (Planet)), Radar scanning, Optical scanning, Astrophysics.

Reliable radar observations and some of the generally unreliable optical observations of Mercury are shown to be consistent with its rotating in a direct fashion with a period just two-thirds of its orbital period. This possibility may be understood as a consequence of the combined solar torques exerted on tidal deformations and on a permanent asymmetry in Mercury's equatorial plane, as suggested by Colombo. A simple model illustrating this superharmonic resonance phenomenon is developed in some detail; several alternative paths by which Mercury could have reached its present state of motion are discussed briefly. (Author)

PB-169 080 **Field 3A**
CFSTI Prices: HC$3.00 MF$0.75
Leander McCormick Observatory, Univ. of Virginia, Charlottesville.
RELATIVE PROPER MOTIONS OF LONG-PERIOD VARIABLE STARS. ABSOLUTE PROPER MOTIONS, SECULAR PARALLAXES, ABSOLUTE MAGNITUDES AND SPACE VELOCITIES OF MIRA TYPE VARIABLES,
by Harold L. Alden, V. Osvalds, and A. Marguerite Risley. 1961, 62p
Contract Nonr-9827 (00)
Prepared in cooperation with Randolph-Macon Woman's Coll., Lychburg, Va., under Grant NSF-G1829. Pub. in Publications of the Leander McCormick Observatory of the University of Virginia v11 pt20 p111-45 1961; v11 pt21 p147-70 1961.

Descriptors: (*Variable stars, Celestial mechanics), Stars, Position finding, Astronomical data, Tables.

On the plates taken with the 26-inch McCormick visual refractor and with the 26-inch Yale Southern Station photographic refractor the relative positions of 366 Long-period variable stars have been measured and their relative proper motions derived. For 22 variables both McCormick and Yale plates were available and the motions were derived in duplicate. They served for combining the results. (Author)

PB-169 091 Field 3B
CFSTI Prices: HC$7.00 MF$1.75
Michigan Univ., Ann Arbor. Radio Astronomy Observatory.
SOLAR RADIO ASTRONOMY, VOLUME I,
by Mukul R. Kundu. Mar 64, 378p Rept. no. 64-4
Grants NSF-G19133, NSF-GP-1670

Descriptors: (*Sun, Radio astronomy), (*Radio astronomy, Sun), Solar radiation, Extraterrestrial radio waves, X rays, Cosmic rays, Geophysics, Astrophysics, Instrumentation.

Contents: Optical features of the active sun; Propagation and generation of radio waves in the solar atomosphere; Techniques of solar radio observations; The quiet sun radiation; The slowly varying component; Bursts on centimeter wavelengths; Bursts on decimeter wavelengths.

4. ATMOSPHERIC SCIENCES

AD-280 221 Field 4A, 20N
CFSTI Price: HC$1.00
Center for Radiophysics and Space Research, Cornell Univ., Ithaca, N. Y.
INCOHERENT SCATTERING: BASIC IDEAS,
by T. Laaspere. 25 Aug 61, 23p Research rept. RS-28, Scientific-2
Contract AF19 (604)-8804, ARPA Order-106-61
AFCRL 62-105

Descriptors: (*Electromagnetic wave reflections, Ionosphere), (*Ionosphere, Electromagnetic wave reflections), (*Radio waves, Scattering), (*Atmospheric sounding, Radio waves), Probes, Electron density, Geophysics.

Incoherent scattering is discussed in the context of the phenomenon of scattering of radio waves by spatial fluctuations in electron density. A review is given of both the theoretical and the experimental results. Emphasis is placed on the ideas involved in measuring properties of the upper ionosphere, such as electron density, temperature, electron drifts, and the strength and direction of the magnetic field. (Author)

AD-466 648 Field 4A
CFSTI Prices: HC$3.00 MF$0.75
Queen Mary Coll., Univ. of London (England).
SOME F2 LAYER DIFFUSION PROBLEMS INCLUDING A POSSIBLE EXPLANATION OF THE APPLETON ANOMALY,
by P. C. Kendall, D. W. Windle, Sylvia Hargreaves and V. Varnasavand. 1 Mar 65, 63p Scientific-1
Grant AF-EOAR-74-64
AFCRL 65-327

Descriptors: (*Ionosphere, Diffusion), (*Diffusion, Ionosphere), Electron density, Atmospheric motion, Transport properties, Gas ionization, Mathematical analysis.

Contents: The influence of horizontal air motions on F2 region ionization; A qualitative method of estimating the interaction between diffusion and electrodynamic drift under F2 layer conditions; A possible explanation of the Appleton anomaly of the F2 layer: Dougherty's theory of ion drag.

AD-466 998 Field 4B, 20H
CFSTI Prices: HC$1.00 MF$0.50
Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex. Environmental Sciences Directorate.
AN AC PROBE FOR THE MEASUREMENT OF ELECTRON DENSITY AND COLLISION FREQUENCY IN THE LOWER IONOSPHERE,
by John G. McCoy. Jul 65, 14p
Proj. DA-1L13001A91A
ECOM 5003,
N65 29913

Descriptors: (*Probes (Electromagnetic), Alternating current), (*Ionosphere, Electron density), (*Sounding rockets, Payload), Telemetering transmitters, Instrumentation, Measurement, Circuits.

A dual-frequency AC probe is described for the measurement of electron density and collision frequency in the 60 to 120 km region of the lower ionosphere. The instrument is designed to make measurements after payload separation from the rocket vehicle near rocket apogee in the vicinity of 120km. (Author)

C13.46-325 Field 4A, 20N
CFSTI Price: MF$0.50
Central Radio Propagation Lab., Boulder, Colo.
NUMERICAL SIMULATION OF IONOSPHERIC WAVE INTERACTION EXPERIMENTS.
Technical note,
by Thomas M. Georges. 25 Oct 65, 48p
NBS TN-325
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.30.

Descriptors: (*Luxemberg effect, Mathematical models), (*Atmospheric sounding, Luxemberg effect), (*Ionospheric propagation, Radio waves), Ionosphere, Electron density, Probes, Simulation.

The Fejer pulse interaction experiment is simulated numerically by solving, in an iterative fashion, the electron energy balance and magnetoionic propagation equations over a height-time 'matrix' representing a disturbed ionosphere. The complex interdependence of physical variables is more accurately represented by including 'self-distortion' effects on the disturbing pulse, and allowing electron collision frequency and the energy loss coefficient (G) to vary with electron energy and time. Provision is made for nonrectangular disturbing pulses as well as finite-length probing pulses. Phase as well as amplitude interaction effects are calculated. Absorption and phase shift computations are based on the Appleton-Hartree or Sen-Wyller complete (arbitrary angle of propagation) formulations, but the insertion of more sophisticated developments in interaction theory, including electron density perturbations, should be possible without appreciable increase in program complexity. Representative calculations demonstrate the effects of variations in experimental parameters, perturbations of ionospheric conditions, and various interpretational assumptions. The numerical approach offers advantages of simplicity and flexibility to those engaged in design and interpretation of wave interaction experiments. Synthesis of D-region electron density and collision frequency profiles, using the technique 'in reverse,' should prove superior to presently used trial-and-error methods. (Author)

CONF-650534-1 Field 4A
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology.
THE ENERGY AND MOMENTUM BUDGET OF THE ATMOSPHERE ABOVE THE TROPOPAUSE,
by Reginald E. Newell. 1965, 43p
Contract AT (30-1)-906
Prepared for Presentation at International Space Science Symposium, Buenos Aires.

Descriptors: (*Upper atmosphere, Energy), (*Heat transfer, Upper atmosphere).

N65-34906 Field 4B
CFSTI Prices: HC$3.00 MF$0.75
Research Triangle Inst., Durham, N. C.
STUDY ON THE ELECTRON IRRADIATION EFFECTS ON CAPACITOR-TYPE MICROMETEOROID DETECTORS,
by L. K. Monteith. Oct 65, 99p
Contract NAS1-3892
NASA CR-312

Descriptors: (*Micrometeorology, Monitors), (*Monitors, Radiation damage).

PB-168 983 Field 4A
CFSTI Prices: HC$2.00 MF$0.50
Smithsonian Institution. Cambridge, Mass. Astrophysical Observatory.
DENSITY VARIATIONS IN THE HETEROSPHERE.
Special rept. on Research in Space Science,
by Luigi G. Jacchia. 20 Sep 65, 27p SAO-SR-184
Grant NsG-87-60
Presented at the I. A. G. A. Aeronomy Symposium, Cambridge, Mass., 16-20 Aug 1965.

Descriptors: (*Upper atmosphere, Density), (*Atmospheric sounding, Density), Periodic variations, Astrophysics, Geophysics.

Identifiers: Heterosphere.

Five separate types of density variations are recognized in the upper atmosphere at satellite heights. These are: (1) day-to-night variations, (2) variations with solar activity, (3) variations with geomagnetic activity, (4) semiannual variations, and (5) latitude-dependent seasonal variations. Each type of variation is reviewed, together with the present state of knowledge concerning its origin. (Author)

PB-168 985 Field 4A, 22B
CFSTI Prices: HC$1.00 MF$0.50
Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
ATMOSPHERIC DENSITIES AND TEMPERATURES FROM THE DRAG ANALYSIS OF THE SAN MARCO SATELLITE.
Special rept. on Research in Space Science,
by Luigi G. Jacchia and Franco Verniani. 12 Nov 65, 14p SAO-SR-193
Grant NsG-87-60

Descriptors: (*Atmospheric sounding, Satellites (Artificial)), (*Satellites (Artificial), Atmospheric sounding), Atmospheric temperature, Density, Drag, Atmosphere models.

Atmospheric densities have been obtained from the drag analysis of the San Marco Satellite in the interval from December 19, 1964, to February 11, 1965. Temperatures have been computed from the densities using Jacchia's 1964 atmospheric model. The analysis is based on field-reduced Baker-Nunn observations and on Minitrack observations. (Author)

PB-169 053 Field 4A, 22B, 20F
CFSTI Prices: HC$2.00 MF$0.50
Meteorological Satellite Lab., Weather Bureau, Washington, D. C.
AN INVESTIGATION OF DEGRADATION ERRORS IN TIROS IV SCANNING RADIOMETER DATA AND THE DETERMINATION OF CORRECTION FACTORS,
by P. Krishna Rao, Elford G. Astling, and Francis J. Winninghoff. Oct 65, 27p Rept. no. 34

Descriptors: (*Meteorological satellites, Radiometers), (*Radiometers, Meteorological satellites), Solar radiation, Reflection, Earth (Planet), Albedo (Astronomy), Optical scanning, Errors, Optics, Infrared scanning.

Identifiers: TIROS.

The degradation errors in the TIROS IV scanning radiometer data of reflected solar radiation (channel 3) and emitted long-wave radiation (Channel 2) are discussed and correction factors are derived. For the reflected solar radiation measurements, a correction factor was obtained by comparisons with aircraft albedo measurements under cloudless conditions. The results for channel 3 are compared with ballon-flight measurements and other studies. For the channel 2 data, the correction factor was obtained from a comparison of daily average values of outgoing long-wave radiation with the average value on the first day after launch. Variations in the daily averages of outgoing long-wave

radiation for the area bounded by 55 degrees N and 55 degrees S latitudes are compared with variations in the average values at individual points. The correction factors obtained for both channels give reasonable results when applied to individual grid points, but when the corrected values are summarized over the entire field of data they yield quasi-global averages which appear to be too low if radiative equilibrium is assumed. (Author)

PB-169 098 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
Douglas Aircraft Co., Inc., Santa Monica, Calif. Space Sciences Dept.
AIRBORNE MEASUREMENT OF MICROWAVE EMISSION FROM THE EARTH'S SURFACE AND ATMOSPHERE,
by H. A. Hyatt. 1965, 23p Douglas-Paper-3684
Contract Cwb-10932
Presented to the Electromagnetic Sensing Symposium, Univ. of Miami, Coral Gables, Fla., 22-24 Nov 65.

Descriptors: (*Atmospheric sounding, Microwave spectroscopy), (*Microwave spectroscopy, Atmospheric sounding), Earth (Planet), Surface area, Emissivity, Microwaves, Absorption, Atmosphere, Airborne, Radiometers.

This paper reveals the results of a theoretical and experimental investigation of the microwave radiation emitted by the Earth's surface and atmosphere. The study objective was to evaluate the potential application of microwave radiometry to weather satellite reconnaissance. Measurements were obtained by flying an aircraft-mounted radiometer (sensing fluxes at frequencies 22.235 GHz and 15.78 GHz) at high and low altitudes over the Pacific Ocean and Southern California terrain. Average emissivities of 0.85 for the land and 0.53 for the ocean were computed from these measurements. The measurements indicated an average emission line amplitude of 20 ± 2K over oceanic areas at both high (35,800 ft) and low (1,600 ft) altitudes, while the average emission measured over the land was 12 ± 2K. Small nonprecipitating clouds had very little effect on the outgoing radiation field. The data trends in this experiment agree with theory, but the effects of changes in surface emissivity and reflectivity, and in the atmosphere's vertical structure, cannot be explicitly separated for interpretation. (Author)

PB-169 100 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.50
Texas A and M Univ., College Station. Dept. of Oceanography and Meteorology.
SOME REMARKS OF CYCLOGENESIS INDICATIONS AS DETERMINED FROM METEOROLOGICAL SATELLITE OBSERVATIONS, WITH APPLICATION TO THE GULF OF MEXICO AREA.
Final rept.,
by Aylmer H. Thompson, Malcolm E. Gosdin and Raul E. Jimenez. Aug 65, 58p Ref-65-23F
Grant Cwb-WBG-17,
Proj. A/M-349

Descriptors: (*Weather forecasting, Meteorological satellites), (*Meteorological satellites, Weather forecasting), Air mass analysis, Clouds, Aerial photography, Storms, Marine meteorology, Mexico Gulf.

Several of the current theories concerning the genesis of storms based on the dynamics of atmospheric motion suggest specific patterns of the vertical component of the motion. Since storm genesis usually is accompanied by sufficient moisture to yield clouds, such vertical motion patterns should be accompanied by cloud patterns recognizable in satellite pictures. These cloud patterns are deduced from the theories. The prime features of the patterns include evidence of a cloud band oriented roughly east-west and associated with a quasistationary or slowly moving baroclinic zone or front having a significant amount of moisture, and of a moving cloud mass upstream of the baroclinic zone. The latter cloud mass should be dense with a high upper surface, and may have evidence of a high-level circulation system. Actual cases are examined and the anticipated patterns found, though masking influences may cause problems in practical applications. (Author)

PB-169 128 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.75
Travelers Research Center, Inc., Hartford, Conn.
STATISTICAL PREDICTION OF RARE EVENTS.
Final rept., Jun-Dec 65,
by Joseph G. Bryan and Thomas G. Johnson. Dec 65, 65p Rept. no. 7673-199
Contract wb-11135

Descriptors: (*Weather forecasting, Statistical analysis), Probability, Mathematical models, Tests, Programming (Computers).

Research on statistical prediction of rear weather events was concentrated on the discovery and utilization of effective joint predictors since extensive tests of additive models revealed a tendency for predictive accuracy to deteriorate for more severe weather as compared to that achieved in more common and clement weather. The research followed the implications of the hypothesis of Brier: 'Diurnal and semidiurnal atmospheric tides in relation to precipitation variations', in 'Monthly Weather Review', v. 93: p. 93-100, Feb. 1965. Procedures were sought to (1) identify variables having predictive potential, (2) detect joint predictive information of a synergistic type, bound up in pairs of variables, (3) represent single and paired variables in forms suitable for the reconstruction of an unknown prediction function, and (4) concentrate their predictive information so that in subsequent predictor screening the risk of overlooking valuable contributors is mitigated. Appendix A is 'a test for joint effects of two variables', by J. G. Bryan, and Appendix B, by M. Butterworth is a computer program to evaluate the test.

5. BEHAVIORAL AND SOCIAL SCIENCES

AD-293 801 **Field 5A, 14A, 15E**
CFSTI Price: HC$3.00
RAND Corp., Santa Monica, Calif.
ARMY COST MODEL,
by R. N. Grosse. Dec 62, 65p RM-3446-ASDC
See also AD-408 201, AD-408 309.

Descriptors: (*Army, Costs), (*Army budgets, Cost effectiveness), (*Cost effectiveness, Army), Scheduling.

A description is given of the Army cost model that is to be used for rapid cost estimating of alternative forces for use in cost-effectiveness studies and for projecting approximate budget sizes. In the development of this model, a determination was first made as to the kinds of outputs the model should have. In general, these outputs were made compatible with those of the OSD programming system. The model was then structured to simulate Army processes in a simplified manner, the structure being based on an intensive study of the organization, policies, and procedures of the Army. The memorandum describes the data needed to develop the many inputs required for the model and presents a highly summarized schedule on the overall development work. This schedule is broken down into five categories: research, documentation, programming, testing and operations. (Author)

AD-408 201 **Field 5A, 14A, 15C**
CFSTI Price: HC$6.00
RAND Corp., Santa Monica, Calif.
ARMY COST MODEL OPERATORS' MANUAL,
by J. J. Pringle and P. R. McClenon. May 63, 224p RM-3679-ASDC

Descriptors: (*Army, Costs), (*Army budgets, Cost effectiveness), (*Cost effectiveness, Army), (*Instruction manuals, Cost effectiveness), Scheduling, Army procurement.

The manual provides operating instructions for the Army cost model (AD-293 801) developed on behalf of the Office of the Assistant Secretary of Defense (Controller). The manual is one of a series of publications designed to aid in transferring the capability to operate the Army Cost Model from RAND to other organizations. Chapters 1 and 2 provide a general introduction to the use of the model and to procedures for operating it. The remainder of the manual is organized by task, with each chapter covering different operations likely to be required of the operator. Chapters 3 through 9 cover the more more important types of costing problems likely to be encountered by the operators of the model in costing alternative forces. Chapters 10 through 12 cover tasks not classed as costing problems but which will be required in operating and maintaining the model. Chapter 13 covers procedures for the preparation of input data.

AD-408 309 **Field 5A, 14A, 9B**
CFSTI Price: HC$4.00
RAND Corp., Santa Monica, Calif.
ARMY COST MODEL STRUCTURE AND FLOW,
by J. String, Jr. Jun 63, 112p RM-3720-ASDC

Descriptors: (*Army, Costs), (*Army budgets, Cost effectiveness), (*Cost effectiveness, Programming (Computers)), Scheduling, Army procurement.

The Memorandum describes the computer programs, the coding system, and the major data flows of an Army cost model (AD-293 801) designed for rapid costing of alternative force structures and the determining of major item requirements. Several appendixes have been included to supplement the text. The total model consists of ten individual computer programs. Each program is individually initiated through a job control card. Five programs are required for the costing process and must be executed in a prescribed sequence. The remaining five programs are concerned with additional output reports and may be executed as desired. The programs consist of highly flexible basic structures that guide the flow of data according to the coding system. Extensive use is made of subroutining to allow facile modification of data flows. All programs are written for the IBM 7090 computer and employ SCAT (SHARE compiler-assemblertranslator) for translation. (Author)

AD-424 526 **Field 5C**
CFSTI Price: MF$7.00
Stanford Research Inst., Menlo Park, Calif.
THE ECONOMIC POTENTIAL OF COMMUNIST CHINA; VOLUME I,
by Yuan-li Wu, Francis P. Hoeber, and Mabel M. Rockwell. Jun 63, 388p Technical rept. TR-2
Contracts DA-49-092-ARO-10, DA-04-200-506-ORD-710,
Proj. SRI-4320-211

Descriptors: (*Economics, China), (*China, Economics), Population, Agriculture, Labor, Industries, War potential, Scientific research.

The report appraises the Communist Chinese economy, its recent trends, and its potential for growth during the remainder of the 1960's and, in a general way, thereafter. The population, labor force, industrial base, natural resources, and forms of economic organization are analyzed. The gross national product (GNP) and its allocation to military and other major uses are estimated and projected to 1970. The history of the First Five Year Plan, the Great Leap Forward, and the recent economic crisis are studied in detail. It is concluded that the economic crisis has probably now been contained and that recovery is foreseeable, but that the ground lost since the collapse of the Great Leap Forward is such that recovery can only be at moderate rates. During the remainder of this decade, growth of the economy of Communist China can probably not keep pace with that of the Soviet Union and perhaps barely with that of the United States.

AD-424 527
CFSTI Price: HC$5.00 **Field 5C**
Stanford Research Inst., Menlo Park, Calif.
THE ECONOMIC POTENTIAL OF COMMUNIST CHINA. VOLUME 2: APPENDICES,
by Yuan-li Wu, Francis P. Hoeber, and Mabel M.Rockwell. Jun 63, 167p Technical rept. no. TR-2
Contracts DA-49-092-ARO-10, DA-04-200-506-ORD-710,
Proj. SRI-4320-211

Descriptors: (*Economics, China), (*China, Economics), Population, Agriculture, Industries, Labor, War potential, Scientific research.

AD-455 652 **Field 5J, 6S**
CFSTI Price: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
EFFECTS OF BILATERAL CALORIC HABITUATION ON NYSTAGMUS RESPONSES OF THE CAT,
by Mary Jayne Capps and William E. Collins. Sep 64, 24p
AM 64-14

Descriptors: (*Vestibular apparatus, Stimulation), (*Behavior, Nystagmus), Eye, Rotation, Ear, Adaptation (Physiology), Reflexes, Retention, Psychophysiology, Cats.

Identifiers: Habituation, Irrigation (Medicine).

Transfer of bilateral caloric nystagmus habituation to unilateral calorization was investigated in a group of 60 cats. Habituation to bilateral caloric irrigations markedly reduced responses to both less intense and more intense unilateral stimulation. Subsequent testing provided information concerning the effects of caloric habituation on: (1) directional specificity of response, (2) retention of the response decline, and (3) optokinetic nystagmus. Statistical analyses also indicated a sex difference in response magnitude. (Author)

AD-456 655 **Field 5J**
CFSTI Prices: HC$2.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
THE SIZE CUE TO VISUALLY PRECEIVED DISTANCE,
by Walter C. Gogel. Jan 64, 27p
AM 64-13

Descriptors: (*Space perception, Visual signals), Retina, Visual perception, Psychophysiology.

Identifiers: Size.

Evidence indicates that both perceived size S' and retinal size theta are involved in both the relative and familiar size cue to relative depth. There is also evidence to indicate that the familiar size cue cannot be subsumed under the relative size cue. But both types of size cues can be included under the concept of perceived size per unit of retinal size (S'/theta). It is asserted that the perceived depth between objects, as determined by the size cue, is a function of the value of S'/theta associated with each of the objects. Evidence relevant to specifying the relation between values of S'/theta and perceived depth is evaluated with respect to methodological problems involved in the use of comparison field. (Author)

AD-465 800 **Field 5D**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
ARMIES IN THE PROCESS OF POLITICAL MODERNIZATION,
by Lucian W. Pye. 28 Mar 61, 35p P-2265
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge. Dept. of Economics and Social Science.

Descriptors: (*Armed forces (Foreign), Political science), (*Government (Foreign), Armed forces (Foreign)), Leadership, Military organizations, Economics, Attitudes.

Identifiers: Underdeveloped countries.

Conclusion: The military in the underdeveloped countries can make a major contribution to strengthening essentially administrative functions. If the new countries are to become modern nation-states they will have to have a class of competent administrators. They will also have to have responsible and skilled politicians. The military in these countries can contribute to only a limited part of national development.

AD-466 022 **Field 5G**
CFSTI Prices: HC$6.00 MF$1.25
Communication Sciences Lab., Univ. of Michigan, Ann Arbor.
FORMANT ANALYSIS,
by John R. Hanne. Mar 65, 202p Rept. no. 12
Contract Nonr-1224 (22),
Proj. NR-049-122

Descriptors: (*Speech, Analysis), Synthesis, Acoustics, Spectroscopy, Speech recognition.

The investigation begins with a summary of some of the models which have been used to study speech. Closed representations of the output of a simple resonator which are synchronous with the fundamental frequency are examined as a basis of formant analysis. The representations are then discussed with respect to measured speech data. The representations are also used to specify the inherent accuracy limitations of two different formant tracking schemes. Finally, a feasibility study was made of a method of formant tracking which employs a fixed filter bank as an input to an automatic, zero crossing detector which is synchronous with the fundamental frequency. It was concluded that such a device could be built with an accuracy close to the three percent which has been reported for the human difference limen for formant frequency discrimination.

AD-467 961 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Naval Personnel Research Activity, San Diego, Calif.
RECRUIT TRAINING AND REENLISTMENT: AN OVERVIEW.
Interim rept.,
by Warren S. Blumenfeld. Mar 65, 25p Technical bulletin-65-1

Descriptors: (*Naval training, Recuiting), (*Naval personnel, Naval training), Behavior, Management planning, Attitudes, Measurement, Adjustment (Psychology), Food, Food dispensing, Supervision, Group dynamics, Motivation, Clothing, Classification, Tests, Social psychology, Marine corps, Army personnel, Air Force personnel.

Since recruit training experiences may be related to reenlistment four years later, extended visits were made to the Recruit Training Commands at San Diego and Great Lakes in order to become familiar with Navy recruit training and to obtain information regarding recruit values, beliefs, and expectations. Basic training centers of the Army, Air Force, and Marine Corps were also visited to obtain a frame of reference with which to evaluate the observations, information, and comments obtained at the Naval RTCs. Based upon direct observation and comments of the RTC staffs and recruits, and building upon the rationale that (1) recruit training is a job sample and (2) past behavior is predictive of future behavior, areas appearing to be the most promising in terms of concentration of research attention were suggested. The following hypothesis is proposed as a basis for research: As the discrepancy between the values of the individual and of the Navy increases, the probability of his reenlistment decreases. The applicability of this hypothesis to the areas of research cited is indicated. The problem of criteria is discussed, and means for implementing a program of research are outlined. The long-ranged potential of the research program is indicated. (Author)

ORO-629 **Field 5A**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge Operations Office (AEC), Tenn.
TRANSFERENCE OF NON-NUCLEAR TECHNOLOGY TO INDUSTRY.
2 Jul 65, 48p
Committee Report to Oak Ridge Operations Office, United States Atomic Energy Commission.

Descriptors: (*Management engineering, Industries).

PB-168 575 **Field 5G**
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. PUBLICATION 3b, REVISED. CANONICAL FORM OF A TEXT.
1964, 27p

Descriptors: (*Transformational grammars, English language), (*English language, Analysis).

Identifiers: Sentences.

PB-168 578 **Field 5G**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 34. QUESTIONS AND ANSWERS,
by H. Hiz. Mar 61, 15p

Descriptors: (*English language, Analysis), (*Transformation grammars, English language).

Identifiers: Sentences.

PB-168 612 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
Herner, Meyer and Co., Washington, D. C.
CLASSIFYING AND INDEXING FOR THE SPECIAL LIBRARY,
by Saul Herner and Robert S. Meyer. 1957, 8p
SCIENCE v125 p799-803 Apr 26 1957.

Descriptors: (*Libraries, Classification), (*Classification, Libraries), (*Subject indexing, Libraries), Automation.

CONTENTS: Defects of existing systems. Causes of the fects. Tailor-made classifications, Design of specific systems. Advantages of the system. Mechanical searching codes. Areas for future consideration.

PB-168 869 **Field 5K, 13B**
CFSTI Prices: HC$3.00 MF$0.75
Southern Illinois Univ., Edwardsville. Public Administration and Metropolitan Affairs Program.
PUBLIC AWARENESS AND CONCERN WITH AIR POLLUTION IN THE ST. LOUIS METROPOLITAN AREA.
May 65, 83p
Contract PH-86-63-131

Descriptors: (*Missouri, Air pollution), (*Illinois, Air pollution), (*Air pollution, Public opinion), (*Public opinion, Air pollution), Sampling, Attitudes, Social communication, Perception.

The purpose of the St. Louis metropolitan area public opinion survey was: (1) to determine the nature and extent of the air pollution problem as preceived by the residents of the area and to determine what effect, if any, this perception had on their behavior; (2) to determine the accuracy and extent of the public knowledge of air pollution and its effects and to discover the sources of this knowledge; and (3) to determine the readiness of the public to accept and support the various elements of a control program, such as interjurisdic-

tional cooperation and the willingness to pay through taxes and increased prices. The methodology is described and the results are discussed.

PB-168 880 **Field 5H, 5G, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Thomas J. Watson Research Center, Yorktown Heights, N. Y.
ADAPTIVE MAN-MACHINE NON-ARITHMETICAL INFORMATION PROCESSING.
Final rept.,
by Manfred Kochen. Jun 62, 50p
Contract AF19 (604)-8446
AFCRL 62-1
See also AD-288 145, AD-600 047, PB-168 881.

Descriptors: (*Man-machine systems, Data storage systems), Data processing systems, Computer storage devices, Language, Probability, Information retrieval, Simulation.

Identifiers: Computer consoles, Information systems, Sentences, Sorting (Computers), List processing, Llanguages.

The object is to demonstrate the feasibility and properties of a system for helping people record and obtain factual information. This is to be done by means of large, high-speed stores, processors, and communication facilities capable of attracting use. The principal idea involves a growing record of highly interrelated facts. These are expressed in formal sentences that facilitate grouping of such sentences into similiarity classes. They are selected in response to queries by removing ambiguity through continued man-machine conversation. This idea bears a fundamental relation to classification of signals into similarity classes that represent patterns such as printed or spoken phrases. The feasibility of such a system is being established through theoretical arguments based on recent mathematical developments in the analysis of probabilistic graphs, and through IBM 7090 simulation and experimental operation in a realistic environment. (Author)

PB-168 881 **Field 5H, 5G, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Thomas J. Watson Research Center, Yorktown Heights, N. Y.
ADAPTIVE MECHANISMS IN DIGITAL 'CONCEPT' PROCESSING,
by Manfred Kochen. 1962, 24p
Contract AF19 (604)-8446
See also AD-288 145, AD-600 047, PB-168 880.

Descriptors: (*Man-machine systems, Data storage systems), Digital computers, Language, Linguistics, Programming (Computers), Information theory, Computer storage devices, Memory.

Identifiers: L-Languages.

The general question discussed concerns the theoretical possibility (or impossibility) of a machine which can: (a) Assimilate new information at a specified rate. (b) Economically channel recorded information to where it should be at the appropriate time and in a suitable representation: help people with queries. (c) Form 'beliefs' and, by induction, modify them with experience. The paper sketches a theoretical construction within which key problems can be formulated. Such accomplishments as have been attained are compiled and classified in terms of this model. The relatively new techniques of computer programming in the best sense of experimental mathematics, applied to the ideas of conceptprocessing in a way to be described here, appear sufficiently powerful to demonstrate certain properties of the proposed machine. (Author)

PB-168 886 **Field 5B, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Harvard Univ., Cambridge, Mass.
PROGRESS IN AUTOMATIC INFORMATION RETRIEVAL,
by Gerard Salton. 1965, 15p
Pub. in IEEE Spectrum p90-103 Aug 1964.

Descriptors: (*Information retrieval, State-of-the-art reviews), Automatic, Word association, Computers, Reports, Computer storage devices, Dictionaries, Syntax, Statistical analysis, Classification, Search theory, Optimization, Real time.

Identifiers: Time-sharing (Computers), Coding (Documentation), Thesauri, Key words, Information centers, Recall ratio, Clumps (Documentation), Hierarchy, Words.

The survey concentrates on word or text manipulating systems, in which items of information are represented by words in the matural language. Developments in computer organization, notably in time-sharing systems, are first reviewed briefly. This is followed by a description of current capabilities in automatic content analysis and content identification by statistical and structural methods, including word association techniques, term and document clustering, procedures using synonym dictionaries or hierarchical subject arrangements, and syntactic analysis. The design of a variety of automatic information systems is then reviewed-in particular, document retrieval systems, automatic technical centers, and questionanswering systems. An attempt is made to distinguish those system which appear to be technically and economically feasible from other which are likely to remain experimental for the foreseeable future. A prognosis is made of the type of automatic information system likely to become available within the next few years. (Author) Condensation of a paper given at the International Data Processing Conference and Business Exposition, Philadelphia, June 29-July 2, 1965)

PB-169 005 **Field 5J, 5B**
CFSTI Prices: HC$6.00 MF$1.50
American Psychological Association, Washington, D. C. Project on Scientific Information Exchange in Phychology.
REPORTS OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION'S PROJECT ON SCIENTIFIC INFORMA- TION EXCHANGE IN PSYCHOLOGY. VOLUME II,
by William D. Garvey and Belver C. Griffith. Dec 65, 299p APA-PSIEP-10-15
Grant NSF-G-281
Continuation of Grant NSF-G18494.

Descriptors: (*Psychology, Information retrieval), (*Information retrieval, Psychology), Scientific research, Europe, United States, Abstracts, Perivdicals, Scientific personnel, Scientific organizations.

PB-169 039 **Field 5G, 9B, 5B**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
INFORMATION INPUT, RETRIEVAL, AND ANALYSIS,
by Guy H. Dobbs. 30 Jul 65, 11p SP-2146
Prepared for presentation at National Electronics Conference, Chicago, Ill., 25-27 Oct 65.

Descriptors: (*Man-machine systems, Data processing systems), Information retrieval, Computers, Data, Programming languages.

Identifiers: Time sharing (Computers).

Increased emphasis on the design and development of sophisticated programming systems to support data base users has resulted from spiraling information processing demands of management, command-control, design automation, and scientific research. A characteristic that distinguishes current experimentation in the data base problem from traditional file-handling techniques is the attempt to give the information user direct control over the description, creation, data input, organization, retrieval, and presentation of data with minimal support from computer systems specialists. The philosophy of direct user control and interaction, coupled with the economies of the emerging time-sharing technology, promises to free the information user from the necessity (a) to interact with and communicate to the computer systems specialist to describe, organize, and input data; and, more importantly, (b) to preplan and prespecify retrieval and presentation criteria, procedures and format. (Author)

PB-169 065 **Field 5B**
CFSTI Prices: HC$6.00 MF$1.25
Stanford Univ., Calif. Inst. for Communication Research.
THE FLOW OF (BEHAVIORAL) SCIENCE INFORMATION, A REVIEW OF THE RESEARCH LITERATURE,
by William J. Paisley. Nov 65, 206p
Grant NSF-GN-434

Descriptors: (*Scientific research, Documentation), (*Documentation, Scientific research), (*Scientific personnel, Social communication), State-of-the-art reviews, Psychology, Periodicals, Newspapers, Behavior, Symposia, Dissemination.

Identifiers: Scientific information, Literature, Scientific communication, User surveys.

Contents: (study on the information-gathering anddisseminating behavior of scientists). Use studies, 1948-1965: Overview, eclectic chronology of the studies, studies of information flow in the context of the research environment, information flow research in progress. Two detailed summaries: Herbert Menzel, 'The flow of information among scientists: problems, opportunities, and research questions,' New York, Columbia Univ. Bureau of Applied Research, 1958 (PB-144 390); and the reports of the American Psychological Association's project on scientific information exchange in psychology (PB-163 606 through PB-163 613 and PB-166 198). The systemic approach: studies of communication artifacts. Flow of (behavioral) science information to the public.

PB-169 069 **Field 5G**
CFSTI Prices: HC$3.00 MF$0.75
Bunker-Ramo Corp., Canoga Park, Calif.
COMPUTER-AIDED RESEARCH IN MACHINE TRANSLATION D199. A PARSING PROCEDURE FOR A VECTOR-SYMBOL PHRASE GRAMMAR OF RUSSIAN.
Progress rept. no. 12,
by Gary R. Martins and Steven B. Smith. Dec 65, 97p
Contract NSF-C372

Descriptors: (*Machine translation, Russian language), (*Russian language, Grammar), Algorithms.

Identifiers: Sentences.

A computer procedure is described which performs bottom-to-top, direct-substitution parsing from a vectorsymbol phrase grammar. The characteristics of the particular vector-symbol phrase grammar developed under this research program are described. A grammar of this type for Russian is presented and the results of the application of the parsing procedure to Russian sentences are discussed and illustrated. The procedure embodies a generalized method for the recognition and elimination of 'trivially ambiguous' structures. Despite its implementation on a relatively small computer, the procedure operates very efficienctly. (Author)

PB-169 101 **Field 5A**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
THE ROLE OF SYSTEM SCIENCE IN MODERN SOCIOECONOMIC PROBLEMS.
Professional paper,
by T. C. Rowan. 7 Dec 65, 9p SP-2287
Prepared for presentation before the Senate Labor and Public Welfare Committee at Los Angeles, Calif., 19 Nov 65.

Descriptors: (*Systems engineering, Industries), Design, Aircraft industry, Economics, Operations research, Management planning.

Identifiers: Systems analysis, Aerospace industry.

The application of aerospace system science to the civil domain is discussed. System science is defined and traced historically. The elements of system science-- analysis, design and implementation--are described, and some problems, accomplishments and samples of civilian applications are indicated. (Author)

PB-169 113 **Field 5B**
CFSTI Prices: HC$10.00 MF$2.00
Nordforsk, Copenhagen (Denmark).
SCANDINAVIAN RESEARCH GUIDE. DIRECTORY OF RESEARCH INSTITUTIONS WITHIN TECHNOLOGY AND PHYSICAL SCIENCES.
Revised ed. no. 2,
by Elin Tornudd and Claus Topsoe-Jensen. 1965, 450p

Descriptors: (*Scientific research, Directories), (*Denmark, Scientific research), (*Finland, Scientific research), (*Iceland, Scientific research), (*Norway, Scientific research), (*Sweden, Scientific research).

Identifiers: Technology.

6. BIOLOGICAL AND MEDICAL SCIENCES

AD-290 703 **Field 6P**
CFSTI Price: HC$2.00
Goteborg Univ. (Sweden).
STRUCTURE OF INNER EAR SENSORY EPITHELIAL CELLS IN RELATION TO THEIR FUNCTIONS.
Research rept.,
by Harlow W. Ades, Hans Engstrom, andJoseph E. Hawkins, Jr. 1963, 28p
Contract N62558-263, Grant PHS-0H-93
Task RAE-20A-028/5611/R005-01-001
NAVMED MR005.13-2005 4-1

Descriptors: (*Ear, Cytology), (*Vestibular apparatus, Cytology), Cells (Biology), Sensory mechanisms, Morphology (Biology), Physiology, Hearing, Hair, Histology, Electron microscopy, Sweden.

The structure and relationships of the hairs of the cochlear and vestibular sensory cells have been investigated in fixed and fresh tissue by light, phase-contrast and electron microscopy. The cochlear hairs closely resemble the stereocilia of the vestibular cells, but there are differences in size, number and arrangement between those of the inner and outer hair cells. In the cuticlefree region of the cell-surface a basal body is found, corresponding to the single kinocilium on each vestibular cell. The stiff cochlear stereocilia are regarded simply as levers, transmitting mechanical energy from the over lying tectorial membrane by way of the cuticular plate to the basal body. It seems unlikely that their bending, as such, has the importance generally ascribed to it. In view of the great functional significance of modified kinocilia in other sense organs, the basal body, like the vestibular kinocilium, with its associated mitochondria, membranes and granules, appears to be the essential excitable structure of the hair cells. (Author)

AD-295 134 **Field 6P**
CFSTI Price: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
ABSOLUTE IDENTIFICATIONS OF CUTANEOUS STIMULI VARYING IN BOTH INTENSITY LEVEL AND DURATION,
by Glenn R. Hawkes. Sep 62, 8p CARI-62-16

Descriptors: (*Sensory perception, Skin), (*Skin, Sensory perception), Touch, Stimulation, Electric currents, Intensity, Statistical analysis, Identification.

The number of possible absolute identifications of electrical cutaneous stimuli varying in both stridence and duration was investigated for both experienced and naive Os. In some sessions, an equal number of stridencies and durations were used; in others there were more stridence levels than durations or the reverse. Maximum transmission of information was with combinations of four stridence levels and four durations. The channel capacity was about 2.97 bits for the experienced Os and 2.76 bits for the naive ones. Experience was not a statistically significant factor when an equal number of durations and stridence levels were used. In sessions with unequal numbers of durations or stridencies, experienced Os transmitted significantly more information and both groups were more efficient when identifying combinations with more durations than stridence levels. Experienced Os identifying stimuli varying in stridence or duration under conditions comparable to those of the present study have been reported to transmit about 1.45 to 1.7 bits in each of these (unidimensional) situations. The value of 2.97 bits of this study was just a little less than the simple sum of the performances obtained with the dimensions used singly, but it was also apparent that the dimensions are not fully interchangeable. (Author)

AD-295 135 **Field 6S, 1B**
FSTI Price: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
CIVIL AEROMEDICAL RESEARCH: RESPONSIBILITIES, AIMS, AND ACCOMPLISHMENTS,
by Stanley R. Mohler. Oct 62, 21p CARI-62-20

Descriptors: (*Medical research, Civil aviation), (*Aviation medicine, Aviation safety), (*Civil aviation, Aviation safety), Aviation accidents, Aviation personnel, Human engineering, Physiology, Psychology, Aviation injuries, Performance (Human), Aging (Physiology), Drugs, Hypoxia, Fatigue (Physiology), Toxicity, Pilots.

Civil aeromedical research conducted by the Aviation Medical Service of the Federal Aviation Agency is concerned primarily with (1) elucidating those mental and physical attributes of civil airmen most vital to the safe operation of present and proposed civil aircraft; (2) providing the civil aviation industry, from the designer to the operator, with adequate information relative to the physiological, psychological and medical characteristics of civil aircrew members, passengers, and ground support personnel; (3) determining the means by which human tissues may be protected from injury during civil aircraft accidents; and (4) developing means by which the effects of aging, drugs, fatigue, hypoxia, toxic substances and other factors, can be measured with respect to their influence on performance by civil airmen. (Author)

AD-295 136 **Field 6S**
CFSTI Price: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
A CASE OF SURVIVAL OF EXTREME VERTICAL IMPACT IN SEATED POSITION,
by Richard G. Snyder. Oct 62, 17p CARI-62-19

Descriptors: (*Deceleration, Tolerances (Physiology)), (*Tolerances (Physiology), Impact shock), (*Crash injuries, Falling bodies), Acceleration, Free-fall models, Humans, Posture, Survival, Pathology, Wounds : injuries.

Physical, biophysical, and medical data are presented concerning the case of a 20-year-old male of excellent physical condition who jumped from the Golden Gate Bridge in San Francisco, surviving for ten days a freefall deceleration in the seated position (buttocks to head) of a calculated 4128 g for .0023 seconds. Specific trauma resulting from this impact indicates that this may closely approach the extreme human survival tolerance (s) to impact in this position, and that, while distribution of forces through support of the upper torso may greatly minimize injury to the skeletal system, protection of internal organs will present a much more difficult problem. (Author)

AD-295 137 **Field 6S**
CFSTI Price: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
EFFECT OF INCREASED VENOUS PRESSURE ON RENAL HEMODYNAMICS,
by Lerner B. Hinshaw, Charles M. Brake, P. F. Iampietro, and Thomas E. Emerson, Jr. Oct 62, 14p CARI-62-18

Descriptors: (*Kidneys, Blood pressure), (*Blood pressure, Kidneys), (*Blood circulation, Kidneys), Tissues (Biology), Blood vessels, Hypertension, Dogs.

Conflicting evidence exists in regard to the effects of increased venous pressure on renal hemodynamics. Experiments to clarify its role were carried out on twenty-eight intact innervated or isolated perfused dog kidneys. Findings indicate the absence of a 'venousarteriola' reflex. Decreases in total resistance occur as venous pressure is increased through a wide range in both innervated and isolated perfused kidneys. Intrarenal venous and tissue pressures and blood flow are unaffected by large increases in venous pressure, (21-75 mm. Hg), although venous segment resistance declines markedly. Decreases in blood flow are seen when renal vein pressure approaches or exceeds intrarenal venous and tissue pressures. Results confirm previous investigations regarding the importance of tissue pressure and intrarenal venous and tissue pressures. Results confirm previous investigations regarding the importance of tissue pressure and intrarenal venous pressure in renal hemodyanmics, which appear to 'buffer' the kidney against effects of elevated venous pressure through a variable but usually large venous pressure range. The phenomenon of autoregulation may be extended to include a tendency for renal blood flow constancy in the face of wide swings in both renal artery and venous pressures. (Author)

AD-413 392 **Field 6P**
CFSTI Price: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
NEURAL CONTROL OF THE CILIARY MUSCLE,
by Carlton E. Melton, Jr. Mar 63, 14p CARI-63-5
N63 19400

Descriptors: (*Vision, Muscles), (*Muscles, Nerve impulses), Eye, Autonomic nervous system, Nerve cells, Neuromuscular transmission, Retina, Control, Cats.

The cat ciliary muscle was shown to respond to both parasympathetic and sympathetic nerve impulses in vitro. Sympathetic responses were directionally opposite to parasympathetic responses and are interpreted as active contractions of the radial muscle layer. Such contractions in the intact eye should result in accommodation of the eye for distant vision. (Author)

AD-413 393 **Field 6N, 1B**
CFSTI Price: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
A SIMPLE FIELD TEST FOR THE ASSESSMENT OF PHYSICAL FITNESS,
by Bruno Balke. Apr 63, 10p CARI-63-6
N63 19836

Descriptors: (*Aviation personnel, Physical fitness), (*Physical fitness, Aviation personnel), Aviation safety, Oxygen consumption, Pilots, Exercise, Medical examination, Tests.

An essential factor in air safety is the physical and mental fitness of all personnel directly involved in operations of general, commercial, and military aviation. Standardization and classification of fitness, however, have not been established to a degree which would allow for much more than a differentiation between 'normal' health and pathological disturbances. Much scientific work is in progress, however, to contrive, within the wide area of 'normal' health, meaningful categories of physical fitness according to physiological criteria. Testing a large population-important for the esta-

blishment of standards-requires test procedures of simple design but capable of rendering results which are comparable to those of more complex and time consuming laboratory tests. The experimental work reported here is considered a minute contribution to the eventual establishment of physical fitness standards which might become helpful for acquiring and maintaining optimum work efficiency. The experiments indicated that a 15-minute best-effort run can be utilized as substitute for a standard work capacity test in the laboratory. Any objection about the adequacy of running as a proper measure of an aviator's or air traffic controller's fitness should certainly be overweighed by the recognition of the fact that this type of test constitutes a satisfactory assessment of the potentially available functional reserves. (Author)

AD-418 504 **Field 6F, 6T**
CFSTI Price: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
PROBLEMS IN AERIAL APPLICATION: II. EFFECTS OF CHLORINATED HYDROCARBONS ON SUBSTRATELINKED PHOSPHORYLATION,
by Jack W. Daugherty, Dane Eugene Lacey, and Patricia Korty. Mar 63, 8p CARI-63-4
N63 21924

Descriptors: (*Halogenated hydrocarbons, Toxicity), (*Insecticides, Metabolism), Civil aviation, Pilots, Phosphates, Esters, Glycolysis, Lactic acid, Methionine, Phosphorylation, Chicken, Rats.

Identifiers: Dieldrin, Lindane, Isodrin, Endrin, Heptachlor.

In a search for an explanation of an earlier finding that dieldrin decreased the rate of methionine uptake by cardiac muscle, chickens and rats were exposed to this compound and the substrate-linked phosphorylation phenomenon was studied during the anaerobic degradation of glucose. Exposure to dieldrin reduced the esterification of inorganic phosphate 50% but did not affect the production of lactic acid. Four other chlorinated hydrocarbons, lindane, heptachlor, isodrin, and endrin did not produce this effect. (Author)

AD-424 640 **Field 6S**
CFSTI Price: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
ANNOTATED BIBLIOGRAPHY OF RECENTLY TRANSLATED MATERIAL, I,
by William E. Collins, Jerry V. Tobias, Mary Jayne Capps, and Mary Ellen Allen. Aug 63, 11p Technical Pub-1

Descriptors: (*Aviation medicine, Bibliographies), Nystagmus, Vestibular apparatus, Semicircular canals, Electroencephalography, Eye, Ear, Reflexes.

An annotated bibliography of translations of foreignlanguage research articles is presented. The 26 listed entries are concerned with studies of voluntary nystagmus, vestibular nystagmus, EEG and vestibular stimulation, and effects of coriolis accelerations. Procedures for obtaining copies of the translations are included. (Author)

AD-425 412 **Field 6S**
CFSTI Price: HC$2.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
HUMAN SURVIVABILITY OF EXTREME IMPACTS IN FREE-FALL,
by Richard G. Snyder. Aug 63, 31p CARI-63-15
N64 11995

Descriptors: (*Deceleration, Tolerances (Physiology)), Free fall models, Impact shock, Survival, Tissues (Biology), Crash injuries, Aviation accidents, Acceleration, Survival.

Human deceleration tolerances beyond the limits imposed by voluntary experimental methods were studied by means of intensive case histories of 137 individuals who have survived extremely abrupt impacts in accidental, suicidal, and homicidal free-falls. Fall distances ranged up to 275' and calculated velocities up to 116 ft/sec (79 mph). Physical and biological data are presented on both sexes with an age range of 1 1/2 to 91 years, and with impacts occurring in all body axis orientations. A detailed analysis of factors found to affect survivability in free-fall impacts is made. These cases, out of some 12,000 free-falls collected in the past two years, demonstrate that humans have survived impact forces considerably greater than those previously believed tolerable. Why some individuals are not fatally injured in certain cases of extreme impact remains unanswered, but evidence suggests that human tissues do not respond as expected in extremely abrupt impacts having time durations of less than .0006 seconds. (Author)

AD-425 565 **Field 6S**
CFSTI Price: MF$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
NYSTAGMUS RESPONSES OF THE CAT TO ROTATION AND TO DIRECTIONALLY EQUIVALENT AND NONEQUIVALENT STIMULI AFTER UNILATERAL CALORIC HABITUATION,
by William E. Collins. Aug 63, 12p CARI-63-14
N64 11949

Descriptors: (*Acceleration tolerance, Nystagmus), (*Nystagmus, Acceleration tolerance), (*Vestibular apparatus, Nystagmus), Rotation, Stimulation, Reflexes, Nervous system, Physiology.

Identifiers: Habituation, Irrigation (Medicine).

Six cats were exposed to mild angular acceleration before and after an intervening series of 15 caloric irrigations. All trials were in total darkness. Slow-phase displacement of the eyes, beat-frequency, and duration of nystagmus were scored. All 3 measures reflected a decline in both the primary and the secondary caloric measures. Responses to rotation following the caloric habituation showed almost no change, i.e., there was no apparent stimulus generalization. Differences in: (a) the patterns of nervous excitation elicited by unilateral and bilateral stimulation; and (b) intensity, were hypothesized as possible causes for the failure to obtain transfer. Additional unilateral caloric trials confirmed reports that the reduction of nystagmus is specific to the direction elicited during habituation trials. (Author)

AD-428 899 **Field 6S, 6P**
CFSTI Prices: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
APPLICATION OF A 'RELATIVE' PROCEDURE TO A PROBLEM IN BINAURAL BEAT PERCEPTION,
by Jerry V. Tobias. Aug 63, 10p CARI-63-17
N64 14411

Descriptors: (*Auditory perception, Thresholds (Physiology)), Hearing, Audiometry, Audiofrequency, Auditory nerve, Ear, Stimulation.

The existence of binaural beats has long been considered an indication of binaural interaction for timing and for periodicity information. In the past, bilaterally matched sound pressure or sensation levels have been used in the investigation of these beats and the measuring technique was one which may be termed 'absolute.' However, the present study, in investigating with a 'relative' technique the limits of dichotic intensity which permit binaural beats, shows that listeners respond to the presence of beats whenever the tones to both ears are above threshold. It is suggested that this new result fits more neatly into current theoretical formulations. The frequencies investigated ranged from 100 to 2000 cps. As other authors have previously reported, the best performance occurred in the 400-600 cps range. The present findings strengthen the case for an auditory nervous system with timing channels independent of other transmission lines and, thereby, also have implications for pitch theory. (Author)

AD-447 092 **Field 6O, 6S, 6P**
CFSTI Price: HC$3.00
California Coll. of Medicine, Los Angeles.
STUDIES IN NIGHT VISION.
Interim technical rept. no. 3, 25 Mar-25 Jun 64, by B. B. Brown and James E. Shryne, Jr. 25 Jun 64, 68p
Contract DA-44-009-AMC-367 (T), Task 8F23-11-001-07
N64 33690

Descriptors: (*Vision, Measurement), (*Visual perception, Measurement), (*Drugs, Visual perception), (*Adaptation (Physiology), Measurement), Recall, Eye, Motion, Stress (Psychology), Correlation techniques, Color vision, Electroencephalography.

AD-456 653 **Field 6E, 6N**
CFSTI Price: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
THE EFFECT OF PHYSICAL CONDITIONING ON AN INDIVIDUAL BEFORE AND AFTER SUFFERING A MYOCARDIAL INFARCTION,
by John Naughton, Bruno Balke, and Francis Nagle. Jan 64, 11p
AM 64-2

Descriptors: (*Cardiovascular diseases, Convalescence), (*Physical fitness, Cardiovascular diseases), Pathology, Exercise, Metabolism, Body weight, Electrocardiography, Stress (Physiology), Rehabilitation, Training, Therapy, Blood pressure, Blood chemistry.

Personnel engaged in aviation activities is not exempted from the development of coronary heart disease: a 54 year old white male suffered an acute inferoseptal myocardial infarction after he had voluntarily taken part in a regular exercise program designed to improve the conditions of existing hypertension, over-weight and hyper-chlesterolemia. The post-infarct recuperation was uncomplicated. Four weeks later physical activities were slowly increased from day to day. A remarkable progress in restoring cardio-respiratory efficiency was observed when the training was switched from dull types of exercises to simply competitive ball games. The training response was similar to that observed in normal individuals. 20 and 23 weeks post-infarct this individual was normotensive, had a normal serum cholesterol concentration and a near-normal body weight. In addition, his capacity for making cardio-respiratory adjustments to high metabolic demands exceeded the originally established level. (Author)

AD-456 654 **Field 6E, 6L**
CFSTI Price: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
THE GRADATIONAL STEP TEST FOR ASSESSING CARDIORESPIRATORY CAPACITY,
by Francis Nagle and Bruno Balke. Jan 64, 14p
AM 64-3

Descriptors: (*Exercise, Test methods), (*Physical fitness, Test methods), (*Cardiovascular system, Medical examination), (*Respiratory system, Medical examination), Test equipment, Stress (Physiology), Oxygen consumption, Respiration, Metabolism, Effectiveness.

The definite need for an objective and practical test of cardiorespiratory adaptive capacity has been mentioned frequently. To be of general usefulness, such a test should be applicable to situations in the physician's medical practice, in the clinical and physiological laboratory, and in physical training or education. This desired versatility excludes the treadmill and even the bicycle ergo-

meter from use and points toward a stepping device permitting quick adjustments of the stepping height. In attempts to develop a step test which would allow for the assessment of work capacity in a similar fashion as the standardized treadmill test used effectively for many years, experiments were carried out on a slumsy 4-step box; with an abbreviated treadmill test; on various designs of stepping devices with adjustable platform height; and with several different stepping procedures. As result of these studies a suitable stepping device and a feasible testing procedure evolved for the assessment of functional adaptive capacity. This test provides for minute-byminute increments of energy expenditure in multiples of the basal metabolic rate (Mets), ranging from 2.5 to 15 Mets within a 25-minute period in tests with 'normal' individuals. A modified test (slower stepping rate and different step increments) is suggested for the evaluation of patients or other individuals with severely reduced work capacity. In this test the energy demands progress from 2.5 to 9 Mets within a 20- to 22-minute period.

AD-456 656 **Field 6L, 14B**
CFSTI Price: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
DESIGN AND PERFORMANCE CHARACTERISTICS OF A MECHANICALLY DRIVEN VESTIBULAR STIMULATOR,
by William E. Collins and Harlie W. Huffman. Oct 64, 11p
AM 64-15

Descriptors: (*Vestibular apparatus, Test equipment), Spin, Stimulation, Torque, Acceleration, Laboratory equipment, Aviation medicine, Design, Performance (Engineering), Calibration.

A mechanical-drive angular acceleration device was designed and constructed for use as a vestibular stimulator. Calibration data obtained with a tachgenerator, an angular accelerometer, and an electronic counter indicate that (1) accelerations at all rates below 25 degrees per second sq and to all terminal velocities less than 25 rpm are linear; (2) maximum trial-to-trial variability between 0.25 degrees per second sq and 20 degrees per second sq does not exceed ± 0.02 degrees per second sq or ± 1.0% of the acceleration rate, whichever is larger. Thus, the simulator may be used for a large number of vestibular experiments where rates of acceleration and terminal velocities are not required to exceed 20 degrees per second sq and 25 rpm, respectively. (Author)

AD-456 670 **Field 6S**
CFSTI Price: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
AVIATION MEDICINE TRANSLATIONS: ANNOTATED BIBLIOGRAPHY OF RECENTLY TRANSLATED MATERIAL. II,
by Jerry V. Tobias, William E. Collins, andMary Ellen Allen. Oct 64, 13p
AM 64-16,
N65 15308

Descriptors: (*Aviation medicine, Bibliographies), Stress (Physiology), Vestibular apparatus, Hearing, Nystagmus, Fatigue (Physiology), Drugs, Acceleration tolerance, Medical research, Abstracts.

An annotated bibliography of translations of foreignlanguage research articles is presented. The 27 listed entries are concerned with studies of auditory fatigue, auditory malingering, voluntary nystagmus, vestibular function, objective and subjective fatigue, drugs, and forensic science. Procedures for obtaining copies of the translations are included. (Author)

AD-456 671 **Field 6S**
CFSTI Prices: HC$1.00
Civil Aeromedical Research Inst., Oklahoma City, Okla.
PHYSIOLOGICAL RECORDING FROM PILOTS OPERATING IN AIRCRAFT SIMULATOR,
by Carlton E. Melton, Jr. Sep 64, 13p
AM 64-18

Descriptors: (*Pilots, Aviation medicine), Feasibility studies, Central nervous system, Antihistaminics, Tranquilizers, Performance (Human), Drugs, Flight simulators, Electrocaridography, Electroencephalography, Respiration, Galvanic skin response, Eye, Motion, Pulse rate, Body temperature.

Ten physiological records were obtained from each of siz pilots performing simulated flight problems in a C-97 aircraft simulator. The pilots were given therapeutic doses of either a tranquilizer (meprobamate) or an antihistamine (chlorpheniramine) during three of the simulated flights, the others being training or control flights. Records were made of electrocardiogram, heartrate, respiratory rate, galvanic skin response, electroencephalogram (parietal-occipital), electroencephalogram (frontal-central) and lateral eye movements (electro-oculogram). None of the variability of the above parameters, with the exception of the electroencephalograms (to be separately published), was ascribable to drug treatment. The techniques developed during this study are suitable for physiological recording from subjects in the work situation. (Author)

AD-465 885 **Field 6R**
CFSTI Prices: HC$2.00 MF$0.50
IIT Research Inst., Chicago, Ill.
SUSCEPTIBILITY TO INFECTION IN IRRADIATED ANIMALS.
Annual rept., 1 Jul 64-30 Jun 65,
by Bernard J. Mieszkuc and Alan M. Shefner. Jun 65, 31p IITRI-L6018-4
Contract DA-49-193-MD-2630,
Projs. DA-1C622401A096, IITRI-L6018,
Task 1C622401A096-01

Descriptors: (*Radiation effects, Infectious diseases), Bacillus anthracis, Gamma rays, Mice, Survival, Radiological dosage, Statistical data, Radiobiology, Sensitivity.

Exposure of Swiss albino mice to various levels of Co60 gamma radiation and subsequently to various levels of infection with virulent and avirulent strains of Bacillus anthracis indicates that a significant pronounced combined effect is present. At low levels of radiation, bacterial challenges near the LD50 are necessary to demonstrate the combined effect while at high levels of radiation a few organisms produce a pronounced combined effect. The time interval between radiation and infectious challenge significantly affects the degree of interaction with a 7 day interval resulting in higher mortalities than either a 1 or 3 day interval. (Author)

AD-465 942 **Field 6H**
CFSTI Prices: HC$1.00 MF$0.50
Marine Corps Landing Force Development Center, Quantico, Va.
COMPACT HIGH CALORIE RATIONS.
Interim rept. no. 1.
2 Jul 65, 17p
Proj. MC-42-64-01

Descriptors: (*Military rations, Survival kits), Acceptability, Packaging, Nutrition, Packing materials, Tests, Statistical data, Food, Consumption, Marine Corps.

AD-466 693 **Field 6R, 6E**
CFSTI Prices: HC$2.00 MF$0.50
Honeywell, Inc., St. Paul, Minn.
THE EFFECTS OF HIGH-INTENSITY RADIANT STIMULATION OF VARYING WAVELENGTHS AND DURATIONS OF RETINAL SENSITIVITY.
Annual progress rept. no. 2, 1 Jul 64-1 Jul 65,
by N. A. Sidley, H. G. Sperling and W. L. Fowlks. 12 Jul 65, 38p Rept. no. 1549-TDR2
Contract DA-49-193-MD-2457

Descriptors: (*Retina, Photosensitivity (Biological)), (*Psychophysiology, Light pulses), (*Cytochemistry, Retina), (*Radiobiology, Retina), Lasers, Thresholds (Physiology), Pathology, Histology, Blindness, Electrophysiology, Electroretinography, Stimulation, Adaptation (Physiology), Acetylcholinesterase, Cytochrome oxidase, Spectrum analyzers, Time studies, Monkeys.

The report presents a study of the effects of intense spectral stimulation on animal retinae. The study includes the use of xenon arc lamps and ruby, neodymium, and helium-neon lasers. The effects of various wavelengths, durations, and intensities of these sources are measured and assessed by three techniques: (1) Operant conditioned behavioral response to light -- this technique provides data on the time course of recovery of sensitivity to the different parts of the visible spectrum following different wavelengths, durations, and intensities of exposure; (2) Electrophysiological response of the retina to light -- by correlating the electroretinogram (ERG) with behavioral thresholds, a sensitive, rapid method is being developed to assess functional, as opposed to gross pathological, changes in the eye following intense radiation exposure; (3) Pathologicalhistological examination of the excised eyes--techniques are being developed to assess the effects on the retina of light intensities which are high enough to produce long-lasting reversible blindness but not high enough to burn the retina.

AD-466 786 **Field 6M, 6E**
CFSTI Prices: HC$2.00 MF$0.50
Peter Bent Brigham Hospital, Boston, Mass.
BIONOMICS OF THE STAPHYLOCOCCUS IN THE NASAL CARRIER.
Annual progress rept., 1 Apr 64-1 Apr 65,
by Carl W. Walter and Ruth B. Knudsin. 1 Apr 65, 49p
Contract DA-49-193-MD-2455

Descriptors: (*Staphylococcus aureus, Ecology), (*Respiratory diseases, Staphylococcus aureus), Noise, Throat, Culture media, Toxins + antitoxins, Blood, Bacteria, Mycoplasma, Blood circulation, Blood platelets, Biological asssay, Vasoactive agents, Infections, Mortality rates, Growth, Inhibition, In vitro analysis, Escherichia coli, Bacillus cereus, Klebsiella, Pseudomonas aeroginosa.

Identifiers: Gram-negative organisms.

Substances that inhibit the growth of colonies of bacteria were demonstrated. These diffuse through an agar impregnated bacterial filter. Gram-negative bacteria are most inhibitory to other bacteria, but show little interaction with other species of gramnegative bacteria. Strains of Staphylococcus aureus show little inhibition against other species, but exhibit mutual inhibition against other strains of staphylococci. Ninety-four per cent of 32 medical students carried Mycoplasma species. Forty-one per cent carried gramnegative flora in their nostrils; 31 per cent in their throats. Initially 50 per cent and 34 per cent were persistant nasal and throat carriers respectively of S. aureus. After exposure to the hospital environment, these figures shifted to 65 and 63 per cent - a 22 per cent increase in rate of carriage. Statistical analysis of the data indicate possible in vivo evidence for the antibacterial interaction of organisms. The importance of gram-negative infection as a cause of morbidity and mortality in patients with life endangering illness was demonstrated.

AD-466 959 **Field 6A**
CFSTI Prices: HC$1.00 MF$0.50
Rochester Univ., N. Y. School of Medicine and Dentistry.
STUDIES OF METABOLISM AND MECHANISMS OF DESTRUCTION OF THE FORMED ELEMENTS OF THE BLOOD.
Annual progress rept., 1 Aug 64-31 Jul 65,
by Scott N. Swisher and Claude F. Reed. Jul 65, 10p
Contract DA-49-007-MD-632

Descriptors: (*Blood analysis, Lipids), (*Biochemistry, Blood), Cholesterol, Phospholipids, Erytrocytes, Labeled substances, Radioactive isotopes, Sodium compounds, Meta-

bolism, Phosphorylation, Membranes (Biology), Cytology, Clood plasma, Blood diseases, Glucose, Blood chemistry.

Na acetate 1 C14, given intravenously, produces measurable labelling of plasma phospholipids and cholesterol within 24 hours in the dog. Analysis of the exchange of plasma and erythrocyte lipids using this isotope suggest that only 85% of the red blood cell cholesterol is in equilibrium with plasma cholesterol, and that the exchange of lecithin between plasma and red blood cells involves the entire molecule as a unit. The incorporation of extracellular orthophosphate p32 into erythrocyte ATP, inorganic phosphate and 2,3-DPG has been measured at 1/2, 1, 2, 4, and 6 hours, in vitro at 37C, in five patients with Hereditary Spherocytosis (H.S.) and five normal subjects. No difference between the two groups was found in the rate or degree of such incorporation. The lipid composition of the erythrocytes from seven patients with H.S. has been studied and found normal. During in vitro incubation at 37C for 24 hours, H.S. erythrocytes lose about 22 percent of their membrane lipid when no glucose is added. Glucose diminishes this loss of lipid but does not prevent it completely. Ouabain has no effect on lipid loss. Under comparable conditions normal erythrocytes lose little or no lipid.

AD-467 142 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Development Center, Johnsville, Pa. Aviation Medical Acceleration Lab.
PULMONARY FUNCTION IN MAN DURING PROLONGED ACCELERATION. I. DIFFUSING CAPACITY AND BLOOD FLOW,
by Gordon G. Power, Jr., Richard W. Hyde, Raymond J. Sever, Frederick G. Hoppin, Jr., and Jean R. Nairn. 30 Jun 65, 18p NADC-ML-6512
Task WEP-RAE 13J 012/2021/R005 01 01

Descriptors: (*Acceleration, Physiology), (*Lungs, Blood circulation), (*Blood circulation, Lungs), Aviation medicine, Diffusion, Capillaries, Posture, Pressure breathing, Respiration, Carbon monoxide, Alkynes.

The report discusses the possible causes of the decreased arterial oxygen saturation seen when a subject is accelerated in a centrifuge by measuring simultaneously the pulmonary diffusing capacity, and the pulmonary capillary blood flow, using breathholding techniques with carbon monoxide and acetylene. After one minute of forward acceleration at eight times normal gravity, 8G, average capillary diffusing capacity decreased 35% from an initial control of 33.7 to 21.5 ml/min x mm Hq in four subjects. Although this decrease was statistically significant ($p<0.01$) the values observed were not low enough to indicate that impaired diffusion was a prime cause of arterial unsaturation. Average Qc decreased 35% during acceleration from an initial control value of 12.9 to 8.2 L/ min, also a significant change ($p<0.01$). These values may have indicated that total pulmonary blood flow was reduced, but a more likely explanation is that a large portion of pulmonary flow perfused non-ventilated regions. Capillary diffusing capacity and Qc returned toward initial control levels within 8 minutes after acceleration in most instances. (Author)

AD-467 727 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Georgetown Univ., Washington, D. C. Dept. of Biology.
THE METABOLIC EFFECTS OF FEVER AND INFECTION.
Annual progress rept., no. 1, 1 Jul 64-30 Jun 65,
by Irving Gray. 30 Jun 65, 17p
Contract DA-49-193-MD-2598

Descriptors: (*Toxins + antitoxins, Bacillus anthracis), (*Fevers, Biochemistry), Metabolism, Protein, Physiology, Toxicity, Lungs, Oxygen consumption, Blood chemistry, Rats, Pathology, Infections.

The purpose of this research has been to carry out studies on the mechanism of the infections process. Two primary approaches have been taken. (a) The effect of fever on protein turnover and its contribution to the negative nitrogen balance associated with this condition. (b) The effect of a bacterial exotoxin (anthrax) on the metabolism of certain critical organs. In as much as anthrax toxin produces a very definite and extensive lung edema, the first organ studied was the lung and the oxidative metabolism was the function followed. Certain ancillary studies were carried out to try to detect low concentration of circulating antigenic material. By using methionine - S-35, it has been demonstrated that the hyperthermia (106 F) causes about a 30% decrease in protein turnover from control animals at 100 F. There is also an increase, about 10%, in the break down rate of the plasma globulin. When rats are injected with anthrax toxin, the oxygen utilization of the lungs as measured by Warburg manometric techniques is reduced by 30% from controls injected with saline or nontoxic growth medium. It appears that the cause of this depression is the loss of DPN from the tissue. It would thus appear that the lung edema could be the result of the inability of the cells to produce the energy necessary to maintain their integrity. (Author)

AD-467 820 **Field 6C**
CFSTI Prices: HC$1.00 MF$0.50
Loma Linda Univ., Calif.
A STUDY TO DETERMINE THE INCIDENCE OF TRYPANOSOMAL INFECTIONS IN TRIATOMA AND WOOD RATS IN LOWER CALIFORNIA, MEXICO.
Annual progress rept. no. 3 (Final progress), 1 Dec 61-31 Dec 64,
by Raymond E. Ryckman. Jul 65, 18p
Grant DA-MD-49-193-62-G45,
Proj. DA-5010
Task 380-125-01B-813-02

Descriptors: (*Trypanosoma, Rats), (*Rats, Disease vectors), (*Hemiptera, Trypanosoma), Mexico, Public health, Infectious diseases, Bats.

Five species of Triatominae are present in Baja California, Mexico; they are (1) Triatoma rubida, (2) Triatoma protracta, (3) Triatoma peninsularis, (4) Paratriatoma hirsuta, and (5) Dipetalogaster maximus. The principle host of species 1, 3 and 4 above is the wood rat. Neotoma lepida; the hosts for species number 2 above is Neotoma fuscipes and Neotoma lepida; species number 5 above is a very general feeder living in exfoliative rocks with lizards. Triatoma rubida and Triatoma peninsularis were found infected with Trypanosoma cruzi in nature in Baja California; Paratriatoma hirsuta has never been reported infected with Trypanosoma cruzi in nature and no infected P. hirsuta bugs were found infected during this study. Dipetalo-gaster maximus has previously been shown to possess a low infection rate in nature; no infected D. maximus bugs were collected in nature; however, these bugs were readily infected with 5 field collected strains of Trypanosoma cruzi. Dipetalogaster maximum has been colonized for the first time. Triatoma rubida was found to use the fish-eating bat. Pizonyx vivesi for its host on Pond Is., Gulf of Lower California. (Author)

AD-468 278 **Field 6S, 6E**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
SOME EFFECTS OF DIFFERENTIAL PRESSURES APPLIED TO THE HEAD AND BODY OF RATS.
Research rept.,
by Perry Close. 29 Jan 59, 12p Rept. no. 4
Proj. NM-12-01-11,
Task 5

Descriptors: (*Explosive decompression, Tolerances (Physiology)), Pressure, Head, Body, Pressure breathing, Respiratory system, Stress (Physiology), Pathology, Hemorrhage, Cardiovascular system, Muscles, Survival, Rats.

The report deals primarily with the time of survival and the major pathology produced when different pressures are applied to the head than to the body of male albino rats. Greater and lesser pressures upon the head relative to the body and both slow and 'explosive' applications of pressure are considered. (Author)

AD-469 393 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
ACUTE MORTALITY AND RECOVERY STUDIES IN SHEEP IRRADIATED WITH COBALT-60 GAMMA OR 1 MVP X RAYS,
by Gerald E. Hanks, Norbert P. Page, E. John Ainsworth, George F. Leong and Edward L. Alpen. 12 Aug 65, 23p USNRDL-TR-854

Descriptors: (*Radiation injuries, Recovery), (*Mortality rates, Radiation injuries), Mammals, Survival, X rays, Gamma rays, Radiation tolerance, Lethal dosage, Radiation effects, Radiobiology.

The acute LD50 has been determined for the domestic sheep irradiated at 11.0 R/min. with Co60 gamma and at 7.5 R/min. with 1 Mvp X rays. It was found that more than 10% of the deaths occurred after 60 days, indicating that the LD50/60 is a more accurate expression of the radiation lethality of the domestic sheep than the LD50/30. The respective midline air dose LD50/60's are 237 R and 251 R. Mean survival times were dose dependent, varying inversely from 17-36 days with increasing dose. Residual injury has been determined by re-irradiation 30 days after giving twothirds of the LD50/30 dose for both radiation sources. These data that indicate 60-70% recovery has occurred in 30 days. (Author)

AD-470 900 **Field 6Q**
CFSTI Prices: HC$1.00 MF$0.50
BioTechnology, Inc., Arlington, Va.
A STUDY OF THE PROTECTION AFFORDED BY LOW-TRANSMISSION VISORS FOR VARYING DURATIONS OF USE,
by James F. Parker, Jr., Raymond E. Reilly and Robert R. Gilbert. Jul 65, 13p Rept. no. 65-1
Contract Nonr-4185 (00)

Descriptors: (*Eyeglasses, Flashblindness), (*Flashblindness, Eyeglasses), Adaptation (Physiology), Vision, Night flight, Recovery, Time, Effectiveness, Gold, Plating.

The study was designed to investigate the effect of visual adaptation on flash blindness recovery time. The experimental paradigm was as follows. Subjects were adapted to a given level of ambient illumination. They then wore the protective visor for a prescribed period of time during which time they would readapt in terms of the decreased retinal illumination. At the end of this period, they were exposed to a high-intensity flash simulating that of a nuclear detonation. Subjects then performed a standard visual task, the reading of an aircraft instrument dial, as soon as possible. Time to recover useful vision was recorded. The visor was worn during both the flash exposure and the task performance. The protective effectiveness of the Navy gold-coated protective visor, which transmits 2.75% of the visible energy, is not reduced following extended periods of visor wear. The extent of the dark-adaptation produced by decreased retinal illumination when the visor is used is not significant in terms of an increase in the flash blindness recovery period. For totally dark-adapted individuals, there is a minimal increase in flash blindness recovery time, in the order of 1 second, when exposed to a high-intensity flash while wearing the visor. This situation, however, is not realistic in terms of the operational use of a protective visor.

BNWL-SA-53 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
EVALUATION OF EXPOSURE FROM MULTIPLE ENVIRONMENTAL SOURCES IN THE ENVIRONS OF THE HANFORD PLANTS,

by R. F. Foster and R. H. Wilson. 8 Jun 65, 21p CONF-650616-4
Contract AT (45-1)-1830
Prepared for presentation at Health Physics Society, Annual Meeting, Los Angeles.

Descriptors: (*Dose rate, Power reactors), (*Operators (Personnel), Power reactors).

LF-22 **Field 6A**
CFSTI Prices: HC$2.00 MF$0.50
Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
ULTRAMICRO METHODS IN BIOCHEMISTRY. VII. THE DETERMINATION OF PLASMA OR SERUM UREA NITROGEN. VIII. THE DETERMINATION OF SERUM URIC ACID. IX. THE DETERMINATION OF SERUM CREATININE,
by Stewart E. Van and Bernard B. Longwell. Apr 65, 32p
Contract AT (29-2)-1013

Descriptors: (*Blood chemistry, Microanalysis), (*Serum, Microanalysis).

LF-23 **Field 6R**
CFSTI Prices: HC$2.00 MF$0.50
Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
EXPERIMENTAL ANIMAL HOUSING FOR THE FISSION PRODUCT INHALATION PROGRAM,
by H. C. Redman. Aug 65, 23p
Contract AT (29-2)-1013

Descriptors: (*Respiration, Fission products), (*Radiobiology, Laboratory animals).

LF-26 **Field 6M**
CFSTI Prices: HC$0.50 MF$0.50
Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
SUSCEPTIBILITY OF TISSUE CULTURES OF CANINE ORIGIN TO VIRUSES,
by Frank F. Pindak and William E. Clapper. Aug 65, 21p
Contract AT (29-2)-1013

Descriptors: (*Viruses, Tissue culture), (*Tissue culture, Dogs).

N65-35520 **Field 6P**
CFSTI Prices: HC$0.35 MF$0.50
National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
BALLISTOCARDIOGRAPHY; A BIBLIOGRAPHY.
Sep 65, 46p NASA-SP-7021
Performed in cooperation with Federal Aviation Agency, Washington, D. C., Rept. no. FAA-AM-65-15.

Descriptors: (*Ballistocardiography, Bibliographies).

N65-36894 **Field 6S**
CFSTI Prices: HC$1.00 MF$1.00
National Aeronautics and Space Administration. Washington, D. C. Scientific and Technical Information Div.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES.
Aug 65, 156p NASA-SP-7011 (15)

Descriptors: (*Space medicine, Bibliographies), (*Bibliographies, Space biology).

N66-10319 **Field 6Q**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Houston, Tex. Manned Spacecraft Center.
INTERFACE TESTS FOR EVALUATING ABILITY OF PRESSURE-SUITED SUBJECTS TO PERFORM LUNAR SCIENTIFIC TASKS.
Technical memo.,
by Earl V. LaFevers and Curtis C. Mason. Nov 65, 28p NASA-TM-X-1170

Descriptors: (*Pressure suits, Lunar environment), (*Lunar environment, Pressure suits), Performance (Human).

NYO-3234-1 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Hospital for Special Surgery, New York.
BONE TISSUE KINETICS.
Final rept.
Jun 65, 11p
Contract AT (30-1)-3234

Descriptors: (*Bone, Radiobiology), (*Trace studies, Bone).

ORO-631 **Field 6R, 6E**
CFSTI Prices: HC$5.00 MF$1.00
UT-AEC Agricultural Research Lab., Oak Ridge, Tenn.
SEMI-ANNUAL PROGRESS REPORT, JULY 1DECEMBER 31, 1964.
Aug 65, 187p
Contract AT (40-1)-GEN-242

Descriptors: (*Radiobiology, Medicine), (*Veterinary medicine, Radiobiology).

PB-167 578 **Field 6L**
CFSTI Prices: HC$1.00 MF$0.50
Public Health Service, Washington, D. C.
CHAIR STABILIMETER,
by Karl W. Konrad and George N. Oetzel. 1965, 3p

Descriptors: (*Medical equipment, Seats), (*Seats, Medical equipment), (*Body, Motion), (*Motion, Recording systems).

The chair stabilimeter has a chair seat mounted on a flexible steel rod and a movement sensor mounted under the seat and leading off to a pen recorder. The flexible steel rod translates the subject's restless movements into horizontal and vertical seat movement (forward - back, side to side; up and down). The flexible rod is fixed with a sliding clamp --- by which the amount of free rod from clamp to sea can be varied from 4 to 20 inches. The recording device is mounted under the seat plate. It consists of a plastic dish, one-quarter filled with mercury. Around the sides of the dish are columns of contact points. When the subject moves, the seat plate and dish are titled; the mercury slides up the dish side --- successively closing circuits as each contact point is touched. The recording device is attached to a pen recorder which records the number and rate of circuits made. The chair stabilimeter is capable of recording restless movements of a wide range of intensity, from subjects of varying weights (from 30 to 200 lbs.) by choice of appropriate rod diameter.

PB-168 783 **Field 6F, 13B**
CFSTI Prices: HC$1.00 MF$0.50
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
BIOLOGY OF CHICAGO'S WATERWAYS,
by Lowell E. Keup, William Marcus Ingram,Jack Geckler, and William Bliss Horning, II. Oct 65, 24p
PHS Pub-999-WP-32
Rept. on Environmental Health Series. Water Supply and Pollution Control.

Descriptors: (*Illinois, Inland waterways), (*Inland waterways, Aquatic animals), (*Aquatic animals, Inland waterways), (*Plankton, Inland waterways), (*Water pollution, Aquatic animals), Worms, Algae, Mollusca, Fishes, Sedimentation, Purification.

Biological sampling in the Upper Illinois Waterway of the Metropolitan Chicago Area revealed associations of bottom animals indicative of highly degraded water. The bottom animals show responses to both domestic sewage and wastes of industrial origin as degradation agents.

PB-168 861 **Field 6L, 11I, 11J**
CFSTI Prices: HC$3.00 MF$0.75
Battelle Memorial Inst., Columbus, Ohio.
DEVELOPMENT OF BLOOD-COMPATIBLE POLYMERIC MATERIALS.
Summary rept.,
by R. D. Falb, G. A. Grode, M. M. Epstein, B. B. Brand, and R. I. Leininger. 29 Jun 65, 60p

Grant PHS-PH43-64-496

Descriptors: (*Prosthetics, Materials), (*Blood, Compatibility), (*Plastics, Compatibility), (*Elastomers, Compatibility), Polymers, Surfaces, Heparin, Ammonium compounds, Complex compounds, Styrene plastics, Polyethylene plastics,Butadienes, Pyridines, Radiation chemistry, Albumins, Fibrinogen Gamma globulin, Adsorption, Hemolysis, Coagulation, Mechanical organs, Heart.

Identifiers: Vinyl pyridines.

A study was undertaken to identify and define causes of adverse blood-plastic interactions and to generate approaches to solve these problems. Polystyrene, polyethylene, and butadiene/vinyl pyrine materials were rendered nonthrombogenic by the surface attachment of heparin. This heparinization was effected by chemically bonding a quaternary ammonium salt to the polymer surfaces. Zeta-potential measurements provided a very satisfactory means for monitoring the surface reactions involved. It was found that the adsorption of albumin, fibrinogen, and gamma globulin proceeded at slower rates on heparinized polymer surfaces than on untreated surfaces. A brief study was begun on hemolysis caused by plastic surfaces. Attempts to label heparin with surface-35 yielded unsatisfactory results.

PB-168 889 **Field 6T, 6M, 6E**
CFSTI Prices: HC$6.00 MF$1.50
Public Health Service, Cincinnati, Ohio. Div. of Air Pollution.
BOTULISM; PROCEEDINGS OF A SYMPOSIUM,
by Keith H. Lewis and Kenneth Cassel, Jr. Dec 64, 316p PHS-Pub-999-FP-1
Proceedings of a symposium sponsored by Div. of Environmental Engineering and Food Protection and the Robert A. Taft Sanitary Engineering Center, 13-15 Jan 64.

Descriptors: (*Food poisoning, Clostridium botulinum), (*Clostridium botulinum, Food poisoning), Public health, Diseases, Epidemiology, Toxins + antitoxins, Diagnosis, Therapy, United States, Symposia.

Identifiers: Case histories.

This proceedings of a symposium held in Cincinnati in January 1964 includes 21 papers on the epidemiology of botulism, causative organisms, toxins, clinical manifestations and therapy, and prevention of the disease by food processing. In addition to discussions following the presentations, the proceedings include an open discussion on problems of the future. An extensive bibliography with a subject index supplements the presentations and discussions. (Author)

PB-168 891 **Field 6R**
CFSTI Prices: HC$2.00 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
ACTION DE DOSES FRACTIONNEES DE RAYONS X SUR L'HEMOGRAMME ET LA FORMULE PROTEIQUE DE LA SOURIS (Effect of Fractioned X-Ray Doses on the Haemogram and the Protein Formula of the Mouse),
by Denise Alix and Theodore Pierotti. Oct 65, 32p CEA-R-2848
Text in French; Attached Summary in English.

Descriptors: (*Radiation effects, Mice), (*Gamma globulin, Radiation effects), (*Proteins, Radiation effects), Whole body irradiation, X rays, France.

The authors have studied the action of small doses of radiation on the system of mice. Irradiation 'in toto' was performed at doses of 50, 100, 150 or 200 R according to groups, either as single dose or as fractionated doses. It was established that changes begin to become evident only after total exposure of 100 R. A decrease of cellular constituents occurs, and more often than not an increase of total proteins and gamma-globulins. (Author)

PB-168 936 **Field 6L, 11I**
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
THE DEVELOPMENT OF AN IMPROVED HEMODIALYSIS MEMBRANE.
Summary rept.,
by M. Luttinger, F. A. Sliemers, Jr., C. W. Cooper and R. I. Leininger. 15 Jun 65, 45p
Grant PHS-PH-43-64-496

Descriptors: (*Mechanical organs, Materials), (*Membranes, Materials), (*Blood, Separation), Plastics, Nylon, Epoxy plastics, Osmosis,, Porosity, Crosslinking (Chemistry), Transport properties, Compatibility, Polyvinyl alcohol, Vinylpyrrolidone, Dextran.

The several promising leads developed during the course of the program give encouragement to the belief that a significantly improved hemodialysis membrane can be developed. Dialysis membranes were prepared either by crosslinking water-soluble polymers or by creating a microporous structure in waterinsoluble plastics. Interesting results have been achieved by crosslinking both compatible and incompatible water-soluble polymer mixtures. The performance of candidate membranes was screened by measuring the dialysis rate of a dilute urea solution. When initial results looked promising, transport data for creatinine and uric acid were obtained, and the retention of albumin was checked. Blood compatibility was measured with citrated human blood, which was reactivated by the addition of calcium. Gel cellophane and Cuprophan served as standards for the evaluation of the experimental films. The results obtained with nylon and nylon/epoxy membranes appear most promising in terms of dialysis properties, wet film strength, and potential for modification to less thrombogenic surface activity.

PB-169 002 **Field 6C, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Louisville Univ., Ky. Twin Study.
SOME ADVANCES IN THE STATISTICAL ANALYSIS OF HUMAN VARIATION,
by Steven G. Vandenberg. Feb 65, 22p Research rept. RR-6
Grants PHS-MH-18382, PHS-MH-00843
Prepared for presentation for the Conference on the Biology of Human Variation 11-13 Feb 65, New York Academy of Sciences.

Descriptors: (*Genetics, Statistical analysis), (*Behavior, Genetics), Growth, Humans, Biometry, Children, Anthropometry, Environment, Factor analysis, Correlation techniques, Programming (Computers).

PB-169 003 **Field 6C, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Louisville Univ., Ky. Twin Study.
HEREDITARY FACTORS IN HUMAN GROWTH,
by Steven G. Vandenberg and Frank Falkner. Apr 65, 14p Research rept. RR-7
Grants PHS-MH-18382, PHS-HD-00482

Descriptors: (*Genetics, Growth), (*Growth, Genetics), Children, Environment, Aging (Physiology), Statistical analysis, Tables.

Growth curves were computed by an IBM 1620 for 31 fraternal and 29 identical pairs of twins between the ages of 3 and 5. The formula used was $Y = a + bx + cx$ sq. where Y is height and x is the age in days. This parabola was found to give a good fit over the age range studied (birth through 5 years). F ratios between the fraternal and identical within pair variances were computed to assess the statistical significance of the hereditary component in the parameters of the curve. The F was not significant for (a), the initial status; the F for (b), the growth rate was significant at the 5 percent level of probability; and the F for (c), the deceleration was significant at the 1 percent level. F ratios are also presented for the measurements at each single visit. We conclude that for height in the present small sample, hereditary influence appears to be of paramount importance for the deceleration of the growth rate (which takes effect somewhat later), to be of moderate importance for the rate of growth but not statistically significant for the initial status. (Author)

PB-169 004 **Field 6C, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Louisville Univ., Ky. Twin Study.
HEREDITARY COMPONENTS IN THE PERFORMANCE OF TWINS ON THE WAIS,
by J. Bradford Block. Sep 65, 10p Research Rept. RR-8

Descriptors: (*Genetics, Behavior), (*Behavior, Genetics), Performance (Human), Environment, Children, Performance tests, Verbal behavior, Males, Females, Psychometrics.

A sample of 120 pairs of like-sexed twins was administered the WAIS. The sample consisted of 60 MZ and 60 DZ pairs with an equal number of male and female pairs in each of six age groups from thirteen to eighteen. Zygocity was established by serological tests. Scale scores were used to determine within-pair differences. To evaluate the significance of the hereditary component or components of the individual subtests, the withinpair variance of the DZ twins was compared with the withinpair variance of the MZ twins and the ratio evaluated by Fisher's F and Holzinger's h were also computed. The within-pair variance of the DZ twins was significantly greater than the within-pair variance of the MZ twins on nine of the eleven subtests, as well as on the Verbal, Performance, and Total Scores. (Author)

PB-169 092 **Field 6D**
CFSTI Prices: HC$1.00 MF$0.50
Space and Information Systems Div., North American Aviation, Inc., Downey, Calif.
THE SIMULATION OF COGNITIVE PROCESSES, II; AND ANNOTATED BIBLIOGRAPHY,
by P. L. Simmons and R. F. Simmons. 4 Dec 61, 18p
IRE Transactions on Electronic Computers vEC11 n4 p535-51 Aug 1962.

Descriptors: (*Bionics, Bibliographies), (*Bibliographies, Bionics), Artifical intelligence, Cybernetics, Pattern recognition, Learning, Theory, Mathematical models, Automata, Probability, Nervous system, Physiology, Game theory, Programming (Computers), Programming languages, Information retrieval.

The purpose of the supplement is to add 460 references that were not then included previously (PB-166 531). These additional references bring forward the cutoff date for the cited publications to June, 1961, and expand the original bibliography by more than two hundred citations which were not available at the time the first installment was compiled.

PB-169 094 **Field 6L, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
LITERATURE SURVEY ON BLOOD-PLASTIC INTERACTION,
by R. D. Falb and R. I. Leininger. 20 Oct 64, 21p
Grant PHS-PH-43-64-496

Descriptors: (*Prosthetics, Materials), (*Blood, Compatibility), (*Plastics, Compatibility), Surfaces, Thrombosis, Blood coagulation, Electrical properties, Chemical properties, Cardiovascular system, Mechanical organs, Heart, Reviews.

A summary is given of problems caused by the use of plastics in cardiovascular surgery and a review is made of approaches which have been taken to alleviate these problems. Topics include: nature of the problems of blood-plastic compatibility; approches to the problem of surface-generated thrombus formation; surface roughness; surface wettability; electrical nature of surfaces; chemical nature of the surface; mechanism of blood clotting.

TID-21889 **Field 6R, 18F**
CFSTI Prices: HC$6.00 MF$1.25
Pittsburgh Univ., Pa.
RADIATION DOSE-RESPONSE RELATIONSHIPS BASED ON NEUTRON-INDUCED HEMATOLOGIC CHANGES IN RATS.
Doctoral thesis,
by Donald Gillmor Willhoit. 1964, 203p
Contract AT (30-1)-913
Submitted to University of Pittsburgh, 1964.

Descriptors: (*Dose rate, Reactor accidents), (*Radiation effects, Rats).

TID-22047 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Worcester Foundation for Experimental Biology, Shrewsbury, Mass.
STUDIES ON BIOLOGICALLY ACTIVE AMINES.
Annual progress rept. 1 Jun 64-30 Jun 65,
by Yutaka Kobayashi. 9 Jul 65, 9p
Contract AT (30-1)-2085

Descriptors: (*Amines, Radioactive isotopes), (*Radiobiology, Amines).

TID-3077 **Field 6R, 6E**
CFSTI Prices: HC$6.00 MF$1.25
Atomic Energy Commission, Oak Ridge, Tenn. Div. of Technical Information Extension.
RADIOISOTOPES IN MEDICINE. A SELECTED LITERATURE SEARCH,
by Helen L. Ward. Oct 65, 261p

Descriptors: (*Radioisotopes, Medicine).

7. CHEMISTRY

AD-438 817 **Field 7D**
CFSTI Price: HC$3.00
General Atomic, San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
GAS-SOLID INTERACTIONS AT ELECTRODE SURFACES.
Final rept., 30 Aug 61-20 Mar 64,
by H. Saltsburg and D. P. Snowden. 20 Mar 64, 73p GA-5099
Contract DA-44-009-eng-4832, ARPA Order-223-61
N64 30150

Descriptors: (*Electrodes, Surface properties), (*Nickel compounds, Oxides), (*Oxygen, Chemisorption), Gases, Solids, Chemical reactions, Catalysis, Doping, Chromium, Ions, Rare earths, Magnetooptic effect, Paramagnetic resonance, Microwaves, Frequency.

Identifiers: Nickelous oxide.

A study was made of the frequency-dependent conductivity of powdered NiO, undoped and doped with Cr (3+), and the effects on that conductivity of pulsed gas adsorption of O2. The frequency-dependent conductivity of undoped NiO is not representable as a simple Debye relaxation, but doping with Cr (3+) induces a 'structure' in the frequency-dependent conductivity which, over some frequency range, is of the Debye type. This dependence was shown to result from nonuniform

distribution of Cr (3+) in the solid. The pulsed adsorption of O2 on powdered and single-crystal NiO revealed the existence of transient but long-lived conductivity decays. The mechanism of the decay origin is described and involves the concept of an adsorbed ion slowly being converted to a stable adsorbed neutral. Multiple trapping of the minority carriers is invoked to describe the kinetics. Eventually, with continued O2 adsorption, surface saturation occurs and another type of conductivity decay is observed, this one involving desorptive processes. From the flow dependence of these latter decays, a structure for the ion formed is inferred. Supporting experiments involving EPR, optical studies, and charge carrier mobility measurements are described. Finally, some data are given for the frequency-dependent conductivity and effects of gas adsorption for other oxides, including those of iron, chromium, and several rare earths. (Author)

AD-466 510 **Field 7D, 20M**
CFSTI Prices: HC$4.00 MF$0.75
National Bureau of Standards, Washington, D. C.
PRELIMINARY REPORT ON THE THERMODYNAMIC PROPERTIES OF SELECTED LIGHT-ELEMENT AND SOME RELATED COMPOUNDS.
Technical summary rept. no. 13.
1 Jan 65, 121p NBS-8628
ARPA Order-20,
Projs. NBS-221-0495, NBS-221-0426A
Suppl. to NBS-8504 dated 1 Jul 64, AD-458 915.

Descriptors: (*Thermodynamics, Aluminum compounds), (*Beryllium compounds, Thermodynamics), (*Aluminum compounds, Thermodynamics), Borohydrides, Thermochemistry, Heat of formation, Magnesium compounds, Fluorides, Moments, Deflection, Spectra (Infrared), Mass spectroscopy, Oxides, Graphite enthalpy, X-ray diffraction analysis, Electron diffraction analysis, Crystal structure.

Identifiers: Aluminum oxides, Magnesium fluoride.

New experimental work on the borohydrides of aluminum and beryllium is reported. The mean value found for the standard heat of formation of Al (BH4)8 (298 K) is + 2 kcal/mole for the gas and -5 kcal/mole for the liquid, with an estimated possible error as great as 17 kcal/mole. The infrared spectum of MgF2 (in a krypton matrix), Al (BH4)3 and Be (BH4)2 were measured, and a new band system was discovered for F2+. The bending fundamental of MgF2 appears to be 242/cm. High-temperature mass-spectrometric data on the BeO-Al203 system were treated thermodynamically, and lead to heats of atomization for 02,Al2O, and the new molecule A0Be (as well as the heat of vaporization of liquid Be0Al203). The values for 02 and Al20 agree well with previously available values. Recent precise measurements of the relative enthalpy of graphite over the range 1200-2600 K are summarized. Liquid Al203 was vaporized in vacuum and the condensates subjected to varying programs of annealing. The progress from amorphous to the stable alpha crystalline form was followed in detail by X-ray and electron diffraction.

AD-467 063 **Field 7D**
CFSTI Prices: HC$3.00 MF$0.75
Pennsylvania State Univ., University Park. Dept. of Chemistry.
THE SPECTRA OF NITROGEN OXIDES.
Final rept., 1 Feb 61-30 Apr 65,
by I. C. Hisatsune. 30 Apr 65, 90p
Contract AF19 (604)-7987, Grant PHS-AP-18,
Proj. AF-8603,
Task 860303
AFCRL 65-248

Descriptors: (*Nitrogen compounds, Oxides), (*Spectra (Infrared), Nitrogen compounds), (*Molecular spectroscopy, Nitrogen compounds), Oxygen compounds, Tetroxides, Inorganic acids, Nitric acid, Deuterated compounds, Chlorine compounds, Fluorine compounds, Isotopes, Reports, Thermodynamics, Reaction kinetics, Decomposition, Thermochemistry, Raman spectroscopy, Band spectrum, Reviews.

The infrared spectra of and results from normal coordinate analyses on nitrogen oxides, oxyhalides, and oxyacids obtained during the period from February 1961 to April 1965 are summarized. Reprints of scientific papers published during this period are also included in this report. (Author)

AD-470 919 **Field 7D, 7B**
CFSTI Prices: HC$1.00 MF$0.50
Fulmer Research Inst., Ltd., Stoke Poges (England).
HEATS OF FORMATION OF COMPOUNDS CONTAINING B, Be, Al AND Li.
Final rept.,
by Philipp Gross. 31 Dec 64, 7p R-163
Contract AF61 (052)-447, ARPA Order-317-12,
Proj. AF-3814
AFOSR 65-1048

Descriptors: (*Beryllium compounds, Heat of formation), (*Boron compounds, Heat of formation), (*Aluminum compounds, Heat of formation), (*Lithium compounds, Heat of formation), Oxides, Heat of solution, Heat of reaction, Transition temperature, X-ray diffraction analysis, Fluorides, Complex compounds.

A brief review of the work performed is presented. A preliminary value delta H sub f 298=+27.4± 5.8 kcal is derived for the heat of combination of the oxides in 9Al2O3 . 2B2O3. Measurements on the heat of solution of Al2O3 . Li2O were made. X-ray powder photographs of Li3 AlF6 in a wide temperature range indicate the existence of five forms of the compound designated (alpha, beta, gamma, delta) and epsilon in order of stability at increasing temperatures. The heat of the reaction 2LiF (crystal) + BeF2 (glass)=Li2 BeF4 (crystal) is measured to be delta H sub r = -5.3 ± 0.5 kcal. (Author)

BNWL-69 **Field 7D, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PARAMETRIC EVALUATION OF DTPA, EDTA, AND HEDTA FOR ION EXCHANGE PURIFICATION OF PROMETHIUM,
by E. J. Wheelwright and T. R. Myers. Sep 65, 10p
Contract AT (45-1)-1830

Descriptors: (*Ion exchange, Purification), (*Promethium, Purification).

CONF-650425-2 **Field 7C, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Rutgers-The State Univ., New Brunswick, N. J. School of Chemistry.
MOSSBAUER PARAMETERS FOR METAL-ORGANIC (Fe, Sn) COMPOUNDS,
by R. H. Herber. 1965, 28p
Contract AT (30-1)-2472
Prepared for presentation at Meeting of Advisory Panel on Mossbauer Spectroscopy, International Atomic Energy Agency, Vienna, Austria, 26-30 Apr 65.

Descriptors: (*Mossbauer effect, Metalorganic compounds), (*Metalorganic compounds, Mossbauer effect).

HW-SA-3548 **Field 7A**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
THE EXTRACTION OF SULFURIC ACID INTO BENZENE BY TRI-N-OCTYLAMINE,
by Archie S. Wilson. 25 May 64, 15p
Contract AT (45-1)-1350

Descriptors: (*Sulfuric acid, Separation).

IS-1055 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
Iowa State Univ., Ames. Inst. for Atomic Research.
THE EQUILIBRIUM PHASE DIAGRAMS FOR THE TANTALUM-TANTALUM BROMIDE AND TANTALUMTANTALUM IODIDE SYSTEMS.
by Robert E. McCarley and James C. Boatman. 2 Feb 65, 39p CONF-650401-4
Contract W-7405-eng-42
Prepared for presentation at American Chemical Society, Detroit. Prepared in cooperation with Iowa State Univ., Ames. Dept. of Chemistry.

Descriptors: (*Phase studies, Tantalum compounds), (*Tantalum compounds, Halogen compounds).

LA-DC-6548 **Field 7D**
CFSTI Prices: HC$3.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
COUPLING CONSIDERATIONS IN TWO-ELECTRON SPECTRA,
by Robert D. Cowan and Kenneth L. Andrew. 1964, 64p
Contract W-7405-eng-36
Prepared in cooperation with Purdue Univ., Lafayette, Ind.

Descriptors: (*Atomic spectroscopy, Electrons), (*Excitation, Atomic spectroscopy).

LA-DC-6588 **Field 7C, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
POLYPHENYLALANINE SYNTHESIS DIRECTED BY BROMINATED POLYURIDYLIC ACID,
by David A. Smith. 1964, 6p
Contract W-7405-eng-36

Descriptors: (*Amino acids, Synthesis (Chemistry), (*Synthesis (Chemistry), Amino acids).

MATT-329 **Field 7E, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Princeton Univ., N. J. Plasma Physics Lab.
DECOMPOSITION OF MOLTEN LITHIUM NITRATE BY RADIATION,
by M. D. Kostin, R. C. Axtmann and E. F. Johnson. May 65, 17p
Contract AT-30-1-1238

Descriptors: (*Lithium compounds, Decomposition).

Identifiers: Fused salts, Lithium nitrate.

MLM-1264 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Mound Lab., Miamisburg, Ohio.
A REVIEW OF THE DISSOLUTION OF PLUTONIUM DIOXIDE,
by William S. Gilman. 7 May 65, 12p
Contract AT (33-1)-GEN-53

Descriptors: (*Plutonium compounds, Solutions), (*Solutions, Dioxides).

MLM-1271 **Field 7C**
CFSTI Prices: HC$2.00 MF$0.50
Mound Lab., Miamisburg, Ohio.
PYROLYSIS OF POLYMERS: A BIBLIOGRAPHY,
by Roland W. Kohl. 8 Jun 65, 39p
Contract AT (33-1)-GEN-53

Descriptors: (*Polymers, Pyrolysis), (*Pyrolysis, Polymers).

NAS-NS-3008 (Rev.) Field 7E
CFSTI Prices: HC$1.00 MF$0.75
Florida State Univ., Tallahassee.
THE RADIOCHEMISTRY OF RHODIUM,
by Gregory R. Choppin and James C. Armstrong, Jr. May 65, 86p
Contract AT (45-1)1797

Descriptors: (*Rhodium, Radiochemistry).

NAS-NS-3030 Field 7E
CFSTI Prices: HC$1.00 MF$0.50
Union Carbide Corp., Tuxedo, N. Y. Mining and Metals Div.
RADIOCHEMISTRY OF SELENIUM.
Nuclear Science Series of Nat. Academy of SciencesNat. Research Council, Wash., D. C. Comm. on Nuclear Science,
by V. J. Molinski and G. W. Leddieotte. Nov 65, 58p
Contract W-7405-eng-26

Descriptors: (*Selenium, Radiochemistry), (*Radiochemistry, Selenium).

NYO-2747-3 Field 7B
CFSTI Prices: HC$3.00 MF$0.75
Polytechnic Inst. of Brooklyn, N. Y.
VISIBLE SPECTRA OF TRANSITION METAL CYANIDES DISSOLVED IN MOLTEN SALTS. PART A. SYNTHESIS AND PROPERTIES OF BORAZINES AND CYCLOTRIBORAZANES. PART B.
Final rept.,
by Reed F. Riley. 11 Jun 65, 106p
Contract AT (30-1)-2747

Descriptors: (*Cyanides, Spectra (Visible ; ultraviolet), (*Boron compounds, Synthesis (Chemistry)).

PB-168 879 Field 7E, 13B
CFSTI Prices: HC$2.00 MF$0.50
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
REACTIVITY OF ORGANIC SUBSTANCES IN ATMOSPHERIC PHOTOOXIDATION REACTIONS,
by A. P. Altshuller. Jul 65, 29p
PHS Pub-999-AP-14
Rept. on Environmental Health Series. Air Pollution.

Descriptors: (*Exhaust gases, Oxidation), (*Air pollution, Organic compounds), (*Photochemistry, Organic compounds), Waste gases, Control, Toxicity, Gas analysis, Hydrocarbons, Nitrogen compounds, Oxides, Aldehydes, Ketones, Aerosols, Plants (Botany).

The organic vapors emitted to urban atmospheres by motor vehicles and other sources of emissions consist not only of paraffinic, acetylenic, aromatic, and olefinic hydrocarbons, but also of aldehydes, ketones, alcohols, phenols, and chlorinated hydrocarbons. To estimate the contribution of each of these classes of compounds to photochemical smog, one must know both their atmospheric concentrations and their relative reactivities in atmospheric reactions. Reactivities of organic substances in photooxidation reactions can be considered from many standpoints. Rates of disappearance of the organic substances, rates of disappearance of nitric oxide or of formation and disappearance of nitrogen dioxide, and rates or maximum yields of various products such as oxidant or organic nitrates all can be used as chemical measurements of reactivity. Eye irritation, various types of plant damage, and aerosol formation are indicators of reactivity that can be related only to a limited extent to chemical measurements of reactivity. The problems of developing a single index of reactivity are considered. The application of reactivity measurements to automobile exhaust composition, to control devices, and to improvements in atmospheric purity is discussed. (Author)

PB-168 896 Field 7D, 20M
CFSTI Prices: HC$3.00 MF$0.75
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
CALCULATION OF THE VAPOR PRESSURE AND HEATS OF VAPORIZATION AND SUBLIMATION OF LIQUIDS AND SOLIDS, ESPECIALLY BELOW ONE ATMOSPHERE. IV. NITROGEN AND FLUORINE,
by W. T. Ziegler and J. C. Mullins. 15 Apr 63, 69p Technical rept. TR-1, MR-15
Contract NBS-CST-7404,
Proj. A-663
N64 14404

Descriptors: (*Nitrogen, Thermodynamics), (*Fluorine, Thermodynamics), (*Vapor pressure, Numerical analysis), (*Heat of vaporization, Numerical analysis), (*Sublimation, Numerical analysis), Liquefied gases, Solidified gases, Lowpressure research, Cryogenics.

The vapor pressure and heats of vaporization and sublimation of nitrogen and fluorine were computed at one degree intervals from the normal boiling point to 10K and 14K, respectively, using available thermodynamic data. The computed results have been compared with the published experimental data.

PB-168 930 Field 7B, 8G
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Mineral Industries Experiment Station.
SOLUBILITIES OF ORE MINERALS IN HYDROTHERMAL SULFIDE SOLUTIONS.
Final rept., Feb 62-Feb 64,
by H. L. Barnes, J. L. Haas and S. B. Romberger. Feb 64, 41p
Grant NSF-G21997

Descriptors: (*Ores (Metal sources), Minerals), (*Minerals, Solubility), (*Sulfides, Minerals), Water, Solutions, Copper compounds, Zinc compounds, Lead compounds, Mercury compounds, Iron compounds.

Identifiers: Zinc sulfides, Iron sulfides, Copper sulfides, Lead sulfide, Mercury sulfides.

After construction of a second rocking autoclave unit and setting up of the associated equipment, solubilities of the minerals sphalerite (ZnS), pyrite (FeS2) covellite (CuS), galena (PbS), and cinnabar (HgS) were measured in aqueous sulfide solutions to 200C. (Author)

PB-168 975 Field 7D
CFSTI Prices: HC$2.00 MF$0.50
Arizona Univ., Tucson. Agricultural Experiment Station.
FORCES OF INTERACTION BETWEEN FINELY DIVIDED SILICATE PARTICLES.
Final rept.,
by D. M. Anderson and Paul O. Ricci. Aug 62, 35p
Grant NSF-G13650

Descriptors: (*Silicates, Particles), (*Molecular association, Silicates), Dipole moments, Colloids.

Identifiers: Coulomb forces, Van der Waals forces.

The investigation was undertaken to obtain quantitative data on the nature and magnitude of forces interacting between small silicate particles, first in vacuo and then, if feasible, in controlled atmospheres. The forces of interaction can be separated conveniently into two categories--Coulombic interactions and the van der Waals forces. The latter includes the London dispersion force, or the London-van der Waals force as it is often called, in addition to ion-dipole, dipole-dipole, and other attractions not adequately represented by Coulomb's law. Three attempts were made to measure directly the Londonvan der Waals force acting between 2 electrostatically neutral, parallel glass plates in close proximity. The same measurements were also made with one flat plate and a portion of a sphere. The force observed at a separation distance of one micron was of the order of 0.001 dynes/sq cm and was presumed to be of the London dispersion type.

PB-169 037 Field 7D
CFSTI Prices: HC$1.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
ON THE THEORY OF DROPLET FORMATION IN ONE-DIMENSIONAL FLUIDS,
by Frank C. Andrews. 2 Dec 65, 10p WIS-TCI-141
Grant NSF-G20725

Descriptors: (*Drops, Molecular association), Theory, One-dimensional flow, Particles, Production, Kinetic energy, Liquids, Stability, Temperature.

Identifiers: Particle interactions.

The analysis of one-dimensional fluids shows that drops of arbitrary size may be stabilized at low temperatures.

TID-21101 Field 7D
CFSTI Prices: HC$1.00 MF$0.50
Michigan Univ., Ann Arbor.
DISPLACEMENT REACTION LIMITATIONS ON ELECTROCHEMICAL DETERMINATION OF INTERACTION PARAMETERS,
by John M. Dealy and Robert D. Pehike. 1963, 13p
Contract AT (11-1)-1352

Descriptors: (*Displacement reactions, Electrochemistry), (*Electrochemistry, Displacement reactions).

TID-21112 Field 7D, 11F
CFSTI Prices: HC$1.00 MF$0.50
Michigan Univ., Ann Arbor.
A COMPARISON BETWEEN MEASURED AND CALCULATED ACTIVITY COEFFICIENTS IN MULTICOMPONENT LEAD-BASE LIQUID CONTAINING CADMIUM,
by Kazuhisa Okajima and Robert D. Pehike. 1963, 10p
Contract AT (11-1)-1352

Descriptors: (*Cadmium alloys, Chemical properties), (*Lead alloys, Liquid metals).

TID-22075 Field 7D
CFSTI Prices: HC$2.00 MF$0.50
Purdue Univ., Lafayette, Ind.
SUSPENSIONS OF SOLIDS IN LIQUIDS BY FAN TURBINE IMPELLERS. EFFECT OF SIZE, GEOMETRY, AND FLUID PROPERTIES,
by J. Henry Rushton and Verne W. Smith, Jr. 1965, 38p
Contract AT (11-1)-804

Descriptors: (*Colloids, Particle size), (*Physical properties, Colloids).

UCRL-14379 Field 7D
CFSTI Prices: HC$4.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Livermore.
RELATIONSHIP BETWEEN CHEMICAL BONDING AND THE X-RAY SPECTRUM STUDIES WITH THE SULFUR ATOM,
by David Wesley Wilbur. Aug 65, 107p
Contract W-7405-eng-48

Descriptors: (*Chemical bonds, X-ray spectrum), (*Sulfur, Atomic properties).

8. EARTH SCIENCES AND OCEANOGRAPHY

AD-288 808 **Field 8K, 17J**
CFSTI Price: HC$3.00
Geotechnical Corp., Garland, Tex.
YORK.
Rept. on Long Range Seismic Measurements.
9 Oct 62, 79p
Projs. AFTAC-814, VELA-UNIFORM

Descriptors: (*Seismology, Underground explosions), (*Underground explosions, Seismology), Nevada, Nuclear explosions, Epicenter, Position finding.

Identifiers: Vela-Uniform, York project.

AD-288 859 **Field 8K, 17J**
CFSTI Price: HC$3.00
Geotechnical Corp., Garland, Tex.
BOBAC.
Rept. on Long Range Seismic Measurements.
24 Aug 62, 99p
Projs. ARPA-VELA-UNIFORM, AFTAC-8.4

Descriptors: (*Seismology, Underground explosions), (*Underground explosions, Seismology), Nevada, Nuclear explosions, Epicenter, Position finding.

Identifiers: Vela-Uniform, Bobac project.

AD-288 861 **Field 8K, 17J**
CFSTI Price: HC$4.00
Geotechnical Corp., Garland, Tex.
HAYMAKER.
Rept. on Long Range Seismic Measurements.
7 Oct 62, 110p
Projs. AFTAC-8.4, VELA-UNIFORM

Descriptors: (*Seismology, Underground explosions), (*Underground explosions, Seismology), Nevada, Nuclear explosions, Epicenter, Position finding.

Identifiers: Vela-Uniform, Haymaker project.

AD-288 948 **Field 8K, 17J**
CFSTI Price: HC$3.00
Geotechnical Corp., Garland, Tex.
WICHITA.
Rept. on Long Range Seismic Measurements.
1 Oct 62, 74p
Projs. AFTAC-8.4, VELA-UNIFORM

Descriptors: (*Seismology, Underground explosions), (*Underground explosions, Seismology), Nevada, Nuclear explosions, Epicenter, Position finding.

Identifiers: Vela-Uniform, Wichita project.

AD-296 187 **Field 8K**
CFSTI Price: HC$2.00
Geotechnical Corp., Garland, Tex.
HEBGEN LAKE EARTHQUAKE.
Rept. on Long Range Seismic Measurements.
1 Nov 62, 30p
Projs. 8.4, VELA-UNIFORM
NP 12286

Descriptors: (*Seismology, Earthquakes), (*Earthquakes, Montana), Epicenter, Seismic waves, Seismological stations, Instrumentation.

Identifiers: Vela-Uniform.

AD-450 724 **Field 8F**
CFSTI Price: HC$3.00
Earth Sciences Div., Army Natick Labs., Mass.
CANAL ZONE ENVIRONMENT, PACIFIC SECTOR,
by Robert L. Anstey. Aug 64, 78p Technical rept. ES-12

Descriptors: (*Panama, Geography), Site selection, Environmental tests, Military facilities, Tropical regions.

The Pacific Sector, Canal Zone, contains numerous areas favorable for testing or training in tropical environments under the political jurisdiction of the United States. The climate of this area is tropical wet-and-dry, typical of savanna areas. Seasonal differences in climate are significant in testing program results. The dry season is not representative of wet-tropical conditions, and testing conducted in this sector during this time would not yield the same results as that conducted in a true wettropical environment. Vegetation consists primarily of tropical deciduous forests on the uplands and marsh plants or swamp on the lowlands. Dense vegetation tends to grow in forest clearings. Inland the landscape consists of numerous low rounded hills; coastal benches and terraces are fringed by wide mud flats exposed only at low tide. Representative savanna areas may be found in the Rio Hato Military Reservation, 64 miles west of the Canal Zone in the Republic of Panama. (Author)

AD-450 947 **Field 8E**
CFSTI Price: HC$2.00
Ohio State Univ. Research Foundation, Columbus. Inst. of Geodesy, Photogrammetry and Cartography.
PRACTICAL METHODS FOR THE DETERMINATION OF GRAVITY ANOMALIES AT LOW ELEVATIONS.
Scientific rept.,
by Mohamed F. Madkour. Jun 64, 29p Rept. nos. 45, Scientific-11
Contract AF19 (628)-2771,
Projs. AF-7600, OSURF-1613,
Task 760002
AFCRL 64-577

Descriptors: (*Gravity, Geodesics), (*Geodesics, Gravity), Isostatic change, Statistical analysis.

Identifiers: Gravity anomalies.

The writer has tested most of the available methods for the upward continuation of the gravity anomaly in a previous work. In this present paper he adds two new methods, the modified statistical method and the empirical method, for low elevations. The two developed methods are based on the upward continuation integral. A simple template is suggested to be used with each method. The two methods were tested in Ohio for elevations 5, 10, and 15 km. Their results were compared with those obtained by using Hirvonen's template. A comparison between the standard errors of the results form different methods proves that the new methods are not only simpler than the others, but also more accurate. (Author)

AD-466 207 **Field 8F, 8B**
CFSTI Price: MF$1.00
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
ANALOGS OF YUMA TERRAIN IN THE NORTHWEST AFRICAN DESERT. VOLUME II.
Technical rept.
Jun 65, 28p Rept. no. 6, TR-3-630-Vol-2
Hard copy available in limited supply $2.00 from Army Engineer Waterways Experiment Station, Vicksburg, Miss., See also AD-466 206.

Descriptors: (*Arizona, Deserts), (*North Africa, Deserts), (*Deserts, Maps), (*Maps, Deserts), Analog systems, Mapping, Terrain, Soils, Rock (Geology), Plants (Botany), Photographs, Geography, Algeria.

Contents: Basic terrain factor and analog maps: Characteristics plan-profile; Occurrence of slopes greater than 50 percent; Characteristic slope; Characteristic relief; Generalized landscape; Soil type; Soil consistency; Surface rock; Vegetation; Geometry analogs; Ground analogs; Vegetation analogs; Terrain-type analogs and Section II: Supplemental maps and tabulations; Physiography; Physiography: Descriptions and photographs; Hypsometry; Raisz's landform map; Selected landforms and surface conditions; Landforms-surface conditions: descriptions and photographs.

AD-468 099 **Field 8M, 13M**
CFSTI Prices: HC$2.00 MF$0.50
Marine Corps Landing Force Development Center, Quantico, Va.
ENGINE-DRIVEN TORQUE MEASURING SOIL TEST PROBE.
1965, 47p
Proj. 51-58-01B
Also includes rept. from Naval Air Engineering Lab., Philadelphia, Pa. Engineering Dept. 'Operation and Maintenance Manual. Soil Probe, NAEL (SI) Part No. 611871-1,' rept. no. NAEL-ENG-7216.

Descriptors: (*Soil mechanics, Probes), (*Probes, Soil mechanics), Soils, Hardness, Test equipment, Torsion meters, Military requirements, Foundations (Structures), Anchors (Structural).

An engine-driven torque measuring soil probe was developed as a portable, field instrument to forecast the anchoring potential of the EAW-20 Earth Anchor in all soil types in support of the Short Airfield for Tactical Support (SATS). The engine-driven, torque measuring soil probe was found to be unsuitable in its present configuration for Marine Corps use due to unreliability of operation and limited scope of application. It was recommended that the prototype unit be modified to correct the deficiencies enumerated in the test report.

AD-468 146 **Field 8E**
CFSTI Prices: HC$4.00 MF$0.75
Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency, Fort Belvoir, Va.
GRAVIMETRIC GEODESY FREE OF DENSITY ESTIMATES THROUGH ANALYSIS OF DISCRETE GRAVITY DATA,
by Arne Bjerhammar. 20 Dec 63, 104p Research note-12
Task DA-4A011001B85002

Descriptors: (*Geodesics, Gravity), (*Gravity, Geodesics), Boundary value problems, Integral equations, Harmonic analysis.

For many years, geodesists have been trying to find the method which would make it possible to reduce gravity data from the surface of the earth down to a reference sphere (or ellipsoid) in such a way that the actual boundary value problem could be properly solved in an explicit way. Early methods failed (except for low-order harmonic determination) because there is no way of determining the density. Recent studies of Molodensky indicated that there is no general way of making an analytical continuation of the gravity field. Undoubtedly, these studies are correct if we regard the gravity field in the classical way as a uniquely defined continuum. In the present report, however, the gravity field is defined by a finite set of discrete points all in conformity with the actual circumstances. A solution that fits all used points always exists. For this solution, a simple integral equation is solved by the aid of either regression analysis or harmonic analysis. The gravity reduction problem is thereby solved for the first time without making use of any hypotheses. The solution is derived from adjacent gravity data, using a noniterative method. (Author)

N65-35405 **Field 8G, 3B**
CFSTI Prices: HC$1.00 MF$0.50
Chicago Univ., Ill.
CHEMICAL FRACTIONATIONS IN METEORITES.
Contractor rept.,
by Edward Anders. Sep 65, 22p
Grant NsG-366
NASA CR-299

Descriptors: (*Meteorites, Distillation).

PB-168 938 **Field 8I, 6R**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Mines, Washington, D. C.
A STUDY OF RADIOACTIVE CONTAMINATION RESULTING FROM THE USE OF NU-

CLEAR EXPLOSIVES FOR STIMULATING PETROLEUM PRODUCTION.
Rept. of Investigations,
by C. E. Arthur and F. E. Armstrong. 1965, 15p RI-6684

Descriptors: (*Radiological contamination, Determination), (*Petroleum, Production), Nuclear industrial applications, Experimental design.

Conclusions: Any attempt to use nuclear explosives to stimulate the production of petroleum will result in contamination of the fluids contained in the reservoir to some degree. The amount of contamination will depend upon the size of the explosive device used, the kind of device used, that is, the percentage of yield resulting from fusion, the kind of petroleum reservoir and its elemental composition, placement of the explosive, and the time interval occurring between the time of detonation and the time of beginning production of fluids. The laboratory work shows that to conduct laboratory-scale experiments in an attempt to define unknown or poorly defined parameters is essentially impossible from a practical economic standpoint. Engineering a project involving the use of nuclear explosives for the production of petroleum from a particular petroleum reservoir will require the conduct of a full-scale field experiment in that reservoir before sufficient data may be obtained to properly design the project. (Author)

PB-168 987 **Field 8G, 8D**
CFSTI Prices: HC$1.00 MF$0.50
Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
ANALYSIS OF ARTIFICIAL METEORITIC SPHERULES.
Special rept. on Research in Space Science,
by Frances W. Wright and Paul W. Hodge. 8 Nov 65, 12p SAO-SP-192

Descriptors: (*Petrology, Meteorites), (*Meteorites, Synthesis (Chemistry)), Extraterrestrial topography, Simulation, Laboratories, Iron, Nickel, Minerals, Geochemistry.

Artificial meteoritic spherules, ranging in size from 10 to 150 microns, have been produced in the laboratory by melting samples of an iron and a stony-iron meteorite with an electric arc welder and an acetylene torch. Microprobe chemical analyses showed the spherules to have a highly variable Fe/Ni ratio when analyzed by this method, tending to support the theory that magnetitite spherules found in the upper atmosphere and in glacier deposits are extraterrestrial in origin. (Author)

PB-168 989 **Field 8E, 8J, 8K, 8N**
CFSTI Prices: HC$3.00 MF$0.50
Coast and Geodetic Survey, Rockville, Md.
MAJOR PROGRAMS OF THE COAST AND GEODETIC SURVEY.
Apr 65, 54p
Availability: Original document in color until exhausted.

Descriptors: (*Geodesics, Scientific research), (*Seismology, Scientific research), (*Hydrographic surveying, Scientific research), (*Oceanology, Scientific research), Terrestrial magnetism, Mapping, Research program administration, United States Government.

Identifiers: Coast and Geodetic Survey.

The Bureau on numerous occasions has presented briefings and reviews of its operations to Secretarial Offices of the Department. This document constitutes a compilation of the essential elements of the presentations made. The Bureau's activities are presented under six major programs, Geomagnetism, Seismology, Geodesy, Cartography, Ocean Studies, and Hydrography. It is being given wide circulation within the Coast and Geodetic Survey with the hope that its employees will gain a better understanding of the interrelationships that exist among its various activities and how the planning, coordination and management functions are being carried out.

PB-168 990 **Field 8b**
CFSTI Prices: HC$1.00 MF$0.50
Coast and Geodetic Survey, Rockville, Md.
RAPID TOPOGRAPHIC SURVEYS OF NEW COUNTRIES,
by Martin Hotine. 1965, 9p

Descriptors: (*Mapping, Terrain), Photogrammetry, Surveying, Africa, Asia.

PB-168 991 **Field 8K**
CFSTI Prices: HC$1.00 MF$0.50
Coast and Geodetic Survey, Rockville, Md.
AVERAGE SEISMIC BACKGROUND NOISE AT CAPE KENNEDY, FLORIDA, 1964,
by W. V. Mickey and G. N. Smith. May 65, 19p

Descriptors: (*Seismology, Florida), (*Microseisms, Florida), Background, Noise, Seismic waves.

Identifiers: Cape Kennedy.

The ground motion amplitude in microns (zero to peak) was determined for the maximum typical background noise signals observed for each day during the period from January 18, 1964, through February 1965. There were usually one to three background noise frequencies observed each day, and the predominant period for these signals was 0.5 to 1.5 seconds. The ground amplitude plotted on a graph were average ground motions for all the typical signals measured for the day. The graph indicates a monthly average background noise amplitude of about 0.3 micron (zero to peak), with a maximum of about 0.6 micron. An increase of heavy industrial activity and vehicular traffic will result in an increase of seismic background levels. The intensities at a given location will be a function of the distance from the noise source and the frequency of the forcing functions. Deep alluvial deposits and areas of earth fill are noted for high seismic noise levels. The frequency response characteristics of the shallow sediments will be a contributing factor to the spectra of earth motion. The higher frequency earth motions (over 10 cps) will be attenuated much faster than the lower frequencies. (Author)

PB-168 992 **Field 8K, 17J**
CFSTI Prices: HC$1.00 MF$0.50
Coast and Geodetic Survey, Rockville, Md.
COMPARISON OF SEISMIC EFFECTS OF SALMON EVENT VERSUS NEW MADRID EARTHQUAKE OF FEBRUARY 2, 1962,
by Thomas R. Shugart. May 65, 17p

Descriptors: (*Seismology, Correlation techniques), Underground explosion, Nuclear explosions, Earthquakes, Detection.

Identifiers: Vela-Uniform, Salmon event.

Seismograph recordings of the SALMON Event, an underground nuclear explosion in the Tatum salt dome of Mississippi, were made by 38 stations of the Long Range Seismograph Measurements (LRSM) Program. On February 2, 1962, an earthquake occurred near New Madrid, Missouri, which was recorded at 39 LRSM stations. The unified magnitudes calculated for this earthquake were of the same order as those calculated for the SALMON Event. Moreover, the location of the earthquake in the central portion of the continent was nearer to the location of the SALMON Event (about 550 km) than any other earthquake available for comparison. The amplitudes and periods for the two events are compared.

PB-168 993 **Field 8K**
CFSTI Prices: HC$2.00 MF$0.50
Coast and Geodetic Survey, Rockville, Md.
STRONG-MOTION SEISMIC MEASUREMENTS,
by L. M. Lowrie and W. V. Mickey. May 65, 44p
Proj. DUGOUT

Descriptors: (*Seismology, Underground explosions), Nevada, Explosion effects, Cratering, Seismic waves.

Identifiers: Dugout project.

The 100-ton DUGOUT row charge cratering experiment were monitored with strong-motion seismographs at distances from 146 meters to 1.58 kilometers. Measurements of transitory earth particle displacements and accelerations were made along two recording station lines, one perpendicular to the row, the other in line with the row. The primary purpose of the program was to determine whether there was any azimuthal variation in the propagation of seismic energy dependent upon the configuration of the charge. Maximum earth particle motions indicated symmetrical seismic wave propagation beyond 250 meters. Fourier spectrograms from recordings obtained at 600 meters showed more high frequency content in line with the charge, but at 1.5 kilometers spectrograms were remarkably similar in the two recording station directions. For stations on the two recording lines at a distance of 1.5 kilometers particle motion diagrams showed some similar waveforms and no obvious dissimilarities which could be correlated with the charge configuration. First motion travel times, indicating a velocity of 2.2 km/ sec, were in contrast with laboratory determinations which suggested compressional wave velocities between 3.5 km/sec and 4.5 km/sec for the basaltic material of Buckboard Mesa. This is attributed to vesicularity and other inhomogeneities in the basalt. The conversion of total available source energy to seismic energy was estimated at about 0.3 percent. (Author)

PB-168 994 **Field 8K**
CFSTI Prices: HC$1.00 MF$0.50
Coast and Geodetic Survey, Rockville, Md.
SEISMOGRAPH SYSTEM CALIBRATION,
by L. M. Lowrie. Apr 65, 18p

Descriptors: (*Seismographs, Calibration), Seismological stations, Seismometers, Earthquakes, Explosion effects, Seismology.

From 1961 to 1964 the Special Projects Party of the Coast and Geodetic Survey operated an extremely versatile seismograph to record both naturally occurring seismic signals and signals from explosions. The basic components of this seismograph, the Type 21 seismometer and the L-5 amplifier, were developed especially for the Coast Survey by National Geophysical Company, Inc. Important features of the Type 21 L-5 seismograph are high sensitivity, flat velocity response over a wide range of frequencies and a very large dynamic range. Shaketable calibrations of the seismograph showed for the flat part of the velocity response curve a sensitivity of 1.88 x 100,000 cm/cm/sec, at maximum amplifier gain. Deviations from this value were within ±10 percent for five data channels calibrated with a Maxwell Impedance Bridge. The relative velocity response curve obtained by summing the manufacturer's separate specifications for the seismometer and the amplifier varies in shape only slightly from the curve arrived at by the calibration procedures. (Author)

PB-168 996 **Field 8K, 16A, 22D**
CFSTI Prices: HC$2.00 MF$0.50
Coast and Geodetic Survey, Rockville, Md.
GROUND MOTIONS INDUCED BY SATURN MISSILE LAUNCHES,
by W. V. Mickey and T. R. Shugart. Apr 65, 41p

Descriptors: (*Seismic waves, Guided missile launchers), (*Guided missiles, Launching), (*Launch vehicles (Aerospace), Seismic waves), Motion, Propagation, Vibration.

Identifiers: Saturn (Booster).

Maxium ground motions induced from seven Saturn missiles launches at distance ranges of 100 to about 7000 ft from the launch pad fitted prediction functions. In the 1500 to 7000 ft distance range the maximum ground motions were proportional to maximum sound pressure levels. Vibrations were transmitted through the ground from

the launch pad, but they were much below the maximums which are associated with acoustic-to-seismic energy coupling. The launches on Pad B of Complex 37 indicated that the fundamental vibration mode of the umbilical tower had a period of near 0.7 seconds.

PB-168 998 **Field 8K**
CFSTI Prices: HC$4.00 MF$0.75
Coast and Geodetic Survey, Washington, D. C.
MICROEARTHQUAKE MONITORING AT THE SHOAL SITE,
by W. V. Mickey. Apr 64, 105p
ARPA Order-104-60,
Proj. AFTAC-VELA-T/4052/C-GS/B31

Descriptors: (*Microseisms, Nevada), (*Seimology, Nuclear explosions), Epicenter, Earthquakes, Seismic waves, Propagation, Underground explosions.

Identifiers: Shoal project.

A microearthquake monitoring period from August 20 to November 1, 1963, located 187 shocks of which 77 percent were in an area of about 550 sq km. Calculated seismic energies varied from 1.2x10 to the 9th power to 1.6x10 to the 14th power ergs. Average depth of focus was 9 km with an ordered trend in the most seismic active area possibly related to the Fairview Peak fault. Microearthquake sequences followed the major earthquake patterns in the area with concentrated activity in separated areas, but related in time. Strain release characteristics from reported quakes during the period 1954 to 1962 indicated that when the accumulated strain release approached an amount defined by a derived equation, earthquakes of magnitudes 6.1 to 7.0 occurred shortly thereafter. Microearthquake strain release studies (made before the Event) outlined an area which was the location of a magnitude 3.5 teleseism. Of the parameters defining the hypocenter location, the one least reliable was depth, based upon standard deviation calculations. Using propagation velocities for SHOAL, the computer epicenter location was within 180 meters of ground zero. (Author)

PB-169 076 **Field 8A, 6C**
CFSTI Prices: HC$1.00 MF$0.50
Texas A. and M. Univ., College Station. Dept. of Oceanography and Meteorology.
EVIDENCE FOR CARBONIC ANHYDRASE IN MARINE AND FRESH WATER ALGAE.
Final rept.,
by Carol D. Litchfield and Donald W. Hood.
1963, 25p
Grant NSF-G11591

Descriptors: (*Carbonic anhydrase, Algae), (*Algae, Carbonic anhydrase), Marine biology, Biochemistry, Enzymes, Plants (Botany).

Evidence has been presented for the occurrence of carbonic anhydrase in eleven marine and fresh water algae. The increased reaction rate resulting from the addition of various algal extracts could be inhibited by heating the active fractions to 99C. While suspension in the cysteine-phosphate buffer mixture does increase the reaction rate, the algal carbonic anhydrase appears to be less dependent on cysteine for enzyme stability than are the carbonic anhydrases of many plants. Finally, the carbonic anhydrase activity has been found to be associated with the soluble portion of the various extracts and not with the chloroplasts or other cellular residues. (Author)

PB-169 084 **Field 8G, 8J**
CFSTI Prices: HC$2.00 MF$0.50
Texas A and M Univ., College Station.
THE MINERALOGY OF SOME CAMPECHE BAND SEDIMENTS,
by Richard G. Bader and Keith E. Chave. Aug 62, 42p
Contract Nonr-2119 (04); Grant NSF-G9447,
Projs. A/M-286A, A/M-228
Prepared in cooperation with Lehigh Univ., Bethlehem, Pa., Dept. of Geology.

Descriptors: (*Carbonate minerals, Mexico Gulf), (*Marine geology, Mexico Gulf), (*Mexico Gulf, Carbonate minerals), Sedimentation, Ocean bottom, Calcite, Aragonite, Geochemistry.

Identifiers: Campeche Bay.

The information included in this report was undertaken between February 1960 and August 1961. It is part of a program directed toward a geological understanding of the Gulf of Mexico Campeche area in general and carbonate sediments in particular.

PB-169 105 **Field 8N, 8G**
CFSTI Prices: HC$4.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Dept. of Geology and Geophysics.
GEOMAGNETIC INDUCTION AND THE ELECTRICAL CONDUCTIVITY OF THE EARTH'S MANTLE.
Doctoral thesis,
by Donald H. Eckhardt. 12 May 61, 110p
Grant NSF-G6602

Descriptors: (*Earth (Planet), Electrical conductance), (*Electromagnetism, Geophysics), Terrestrial magnetism, Inductance, Periodic variations, Harmonic analysis.

The ratio of the internal to external source terms of the earth's surface potential for certain geomagnetic fluctuations is indicative of the electrical conductivity of the earth's mantle. Such ratios have already been calculated for harmonics of the diurnal magnetic variation and for storm time variations; in this thesis the ratio for the predominant harmonic of the semiannual variation is calculated but the corresponding ratio for the sunspot variation eludes detection. A nonlinear first order differential equation is derived for any of these ratios as a function of depth and conductivity in a spherically symmetric earth. This equation may be solved numerically to match an observable surface ratio with a conductivitydepth profile, or it may be solved analytically for a few of the infinite number of possible profiles. This approach departs from earlier, and less flexible, methods which are also reviewed in some detail. The new method provides a deeper insight into the problem of induction in a spherically symmetric earth. The thin irregular shell of conductive oceans biases the analyzed ratios for the diurnal and storm time variations. A rough quantitative explanation of this inevitable effect affords an appraisal of the actual significance of the biased ratios. (Author)

PB-169 106 **Field 8G**
CFSTI Prices: HC$4.00 MF$1.00
Cincinnati Univ., Ohio.
SUPPLEMENT TO THE CATALOG OF THE TYPE SPECIMENS OF FOSSILS IN THE UNIVERSITY OF CINCINNATI MUSEUM,
by Robert H. Hansman, Frederick C. Shaw and Wayne A. Pettyjohn. 1962, 136p Geological-53
Grant NSF-G6596

Descriptors: (*Paleontology, Museums), (*Museums, Paleontology), Catalogs, Natural history, Universities, Ohio.

This supplement lists types added to the collections of the University Museum since the publication of the original catalog (Chappars, 1936, Catalog of the type specimens of fossils in the University of Cincinnati Museum, Ohio Journal of Science, vol. 36, no. 1, p. 1-45.). Also included are references to specimens that are not types but have been figured, described, or listed in the literature. Corals originally described by S. A. Miller from the Chouteau limestone of Missouri that were listed in the original catalog are included in this supplement, because individuals among them have subsequently been used as types of new species and otherwise extensively modified taxonomically. The museum contains three large collections of plastotypes of Devonian fossils. These include many of James Hall's types of Devonian pelecypods of New York, types of the Reefton and Baton River beds of New Zealand, and of the Bokkeveld series of the Union of South Africa. Holotypes, paratypes, and cotypes are listed alphabetically with bibliographic references to the original publications; hypotypes and other figured, described, and listed specimens are accompanied by the pertinent references. Plastotypes of specimens in the United States National Museum, the American Museum of Natural History, and the New York State Museum are provided also with references to the published catalogs of those institutions. Cross references are given for specimens that appear more than once in the catalog.

PB-169 110 **Field 8G, 8N**
CFSTI Prices: HC$6.00 MF$1.25
Washington Univ., St. Louis, Mo. Dept. of Geology.
A PALEOMAGNETIC INVESTIGATION OF SOME OF THE PRECAMBRIAN IGNEOUS ROCKS OF SOUTHEAST MISSOURI.
Doctoral thesis,
by Walter Wesley Hays. Jun 61, 218p
Grants NSF-G16742, NSF-G6590

Descriptors: (*Igneous rock, Magnetic properties), (*Terrestrial magnetism, Geologic age determination), Geology, Missouri.

Identifiers: Paleomagnetism.

An investigation was directed toward determining the remanent magnetization characteristics of some of the Precambrian igneous rocks of the St. Francois Mountains of southeast Missouri. Measurements of the magnetic susceptibility and the intensity and direction of remanent magnetization were made on 325 one-inch cylindrical cores prepared from 250 samples of the felsites, diabases, and granites exposed in the Ironton, Fredericktown, and Coldwater quadranglès. These measurements show that the directions of remanent magnetization, although quite variable, are significantly different from the direction of the present geomagnetic field in southeast Missouri. Acfield demagnetization experiments were performed on 135 samples. These experiments show that partial demagnetization in fields of the order of 300 - 600 oersted greatly improves the initial scatter of the remanent magnetization vector. In particular, partial demagnetization is necessary to remove the anomalous components of viscous and isothermal remanent magnetization shown by many samples collected from surface exposures. (Author)

PB-169 111 **Field 8M, 13B**
CFSTI Prices: HC$4.00 MF$0.75
Louisiana State Univ., Baton Rouge. Div. of Engineering Research.
A CONSOLIDATION STUDY,
by Johnie R. Ray, Beverly J. Covington andAra Arman. 1964, 101p Engineering-Research-bull-82
Proj. La.-736-00-24
Research sponsored by Louisiana Dept. of Highways, and Bureau of Public Roads, Baton Rouge, La.

Descriptors: (*Soil mechanics, Foundations (Structures)), (*Civil engineering, Soil mechanics), Soils, Compressive properties, Theory, Experimental data.

In Louisiana, many large earth fills, such as highway and railroad embankments, have settled much faster than settlement estimates have indicated. The purpose of this paper is to study both laboratory and field data which are available for this general area and attempt to determine the cause for this large discrepancy in time and arrive at a procedure for estimating settlement which will more closely follow the actual settlement in the field.

UCRL-14201 **Field 8G, 18C**
CFSTI Prices: HC$3.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
MINING BY CAVING WITH NUCLEAR EXPLOSIONS,
by Spenst M. Hansen and David B. Lombard. 15 Jun 65, 52p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, Mining engineering), (*Rock (Geology), Underground explosions).

9. ELECTRONICS AND ELECTRICAL ENGINEERING

AD-404 901 **Field 9A, 9C**
CFSTI Price: HC$4.00
Stanford Univ., Calif. Stanford Electronics Labs.
A STUDY OF CLASS C APPLICATIONS OF POWER TRANSISTORS AT HIGH AND VERY HIGH FREQUENCIES,
by R. B. Ward. Feb 63, 130p Technical rept. TR-713-1, SEL-62-157
Contract DA-36-039-sc-87300

Descriptors: (*Transistors, Power amplifiers), (*Power amplifiers, Transistors), Low frequency, High frequency, Very high frequency, Power, Matheamatical models, Transmission lines, Diffusion, Electric currents, Transistor amplifiers.

The operation of power transistors in Class C amplifiers at high and very high frequencies is considered. At the lower end of this frequency range, static characteristics are an appropriate basis for the analysis. Two analytic methods and one graphical method of analysis are developed for the nonsaturating case. These methods present the output power, efficiency, and power gain as functions of the operating conditions. By plotting these quantities as contours on peak collector current - flow angle coordinates it is possible to optimize the design. Operation into saturation is examined and equations developed for this case. It is shown that significantly better results can be obtained for this mode of operation. Very high frequency operation is next examined. The various factors affecting such operation are explained and an approximate analysis developed based on an analogy to an RC transmission line. A new method of simulation of a transistor is presented based on the excess-charge-density two-lump model. It is shown how this method can be applied to simulate operation in saturation and to account for the major nonlinearities and two-dimensional effects present in a transistor. Test results are presented for a single two-lump approximation for a vhf power transistor operating as a Class C amplifier. (Author)

AD-407 177 **Field 9A, 9C**
CFSTI Price: HC$3.00
Stanford Univ., Calif. Stanford Electronics Labs.
A CIRCUIT AND NOISE MODEL OF THE FIELD EFFECT TRANSISTOR,
by N. G. Bechtel, Jr. Apr 63, 89p Technical rept. TR-1612-1, SEL-63-044
Contract Nonr-255 (24),
Proj. NR-373 360

Descriptors: (*Noise (Radio), Transistors), (*Transistors, Noise (Radio)), Theory, Mathematical models, Experimental data, Transmission lines, Gain, Circuits, Noise generators, Gates (Circuits), Low frequency, High frequency, Electrical conductance.

The field-effect transistor is treated from an active R-C transmission-line approach, and a circuit model is derived from a lumped-element approximation to the line. The circuit model is found to be similar to that often stated for the high-frequency (hf) circuit model of the vacuum tube. The model is characterized by the low-frequency (1-f) admittance parameters and two high-frequency parameters: the cutoff frequency (which is the frequency at which the hf transconductance falls to one-half of its 1-f value) and a constant relating to the input conductance. A maximum, useful frequency for the device, which is close to the cutoff frequency, is calculated from the model. Measurements are found to be in agreement with the predictions of the theory for frequencies less than the cutoff frequency. A noise model for the field-effect transistor is derived by assigning thermal-noise generators to the conductive elements of the transmission-line model and shot-noise generators to the gate junction. The input-noise current is then found to be proportional to the input conductance and leakage current, and the output-noise current is proportional to the output conductance, transconductance, and leakage current. This model is shown by experiment to be valid for frequencies where 1/f noise is not important. (Author)

AD-429 392 **Field 9E**
CFSTI Price: HC$3.00
Avco Corp., Cincinnati, Ohio. Electronics Div.
DEVELOPMENT OF AN IMPROVED CENTER-FED WHIP ANTENNA.
Rept. no. 4 (Final), 2 Jul 62-30 Nov 63, 30 Nov 63, 77p AvcoAE-215-63-4
Contract DA-36-039-sc-90897,
Proj. DA-3B55-03-001

Descriptors: (*Omnidirectional antennas, Performance (Engineering)), (*Antenna feeds, Omnidirectional antennas), (*Very high frequency, Omnidirectional antennas), Antenna radiation patterns, Ground vehicle antennas, Ranges (Distance), Weight, Gain, Electrical impedance, Standing wave ratios, Power, Dipole antennas, Antenna components.

The purpose, principles of operation, design objectives, and performance of the improved center-fed antenna are reported. Detailed data are given for both the vehicular model and the elevated model which is designed for mast mounting to achieve increased communications range. The vehicular model has been reduced 50 percent in weight compared to its predecessor and its reliability and economy of manufacture has been substantially improved by reduction in the number of components. The elevated antenna weighs 9.4 pounds, including counterpoise, and yields 3 to 4 db greater gain than the RC-292 antenna under the same conditions of operation. The improved antenna meets all the major design objectives and one model has been subjected to a set of stringent environmental tests with very good results. (Author)

AD-430 283 **Field 9A, 20L**
CFSTI Price: HC$3.00
Electro-Optical Systems, Inc., Pasadena, Calif.
SOLID STATE IMAGE INTENSIFICATION.
Final technical rept., 30 Jun 62-31 May 63, by J. Winslow and B. Kazan. 20 Oct 63, 61p
EOS-3200-Final
Contract DA-44-009-eng-5177,
Tasks 8F23-11-001-07, 21X2040

Descriptors: (*Image intensifiers (Electronics), Photoelectric materials), (*Photoelectric materials, Image intensifiers (Electronics)), Solid state physics, Photoelectric cells (Semiconductor), Infrared radiation, Energy conversion, Ferroelectric crystals.

Contents: Investigation of photoconductor performance; Investigation of beam sandwich tube; Ferroelectric image panel.

AD-440 847 **Field 9C, 13H**
CFSTI Price: HC$2.00
Field Emission Corp., McMinnville, Oreg.
APPLIED RESEARCH ON FIELD EMISSION CATHODES.
Quarterly rept. no. 3, 15 Dec 63-15 Mar 64, by E. E. Martin and F. M. Charbonnier. 15 Mar 64, 33p Rept. no. 7
Contract DA-36-039-AMC-03266 (E), ARPA Order-123-63,
Proj. DEFENDER,
Task DA-7776-11-013-38
Continuation of Contract DA-36-039-sc-90829. See also 432 223.

Descriptors: (*Cathodes (Electron tubes), Field emission), (*Field emission, Cathodes (Electron tubes)), Diodes (Electron tubes), Processing, Production, Configuration, Electric fields, Electron beams, Tungsten, Single crystals, Electrochemistry, Electron optics, Chemical milling.

Three large needle-shaped field emission cathodes were tested in diode tubes. Shaping of these cathodes to lessen the effect of the support filaments on the terminal electric fields resulted in an increase in the average beam perveance realized during their operation to a value 47% greater than the average realized during earlier operation of otherwise similar needles. Correction of faults, which became apparent upon testing of edgeshaped single crystal tungsten field emission cathodes, led to the development of an electrochemical means for the shaping of such structures. The main advantage of this technique is to avoid cold working of the material. An emitted beam of 100 amperes at 200 kv, corresponding to a microperveance of 1, has thus far been realized from such an edge. A beam tester for the study of electrostatic focusing of the emission from a large, high voltage, field emission needle was evacuated and is ready for testing. The action of a suitable electrostatic field upon a magnetically constrained electron beam to reduce the transverse component of electron velocity was studied by means of the electrolytic tank analogue and Busch's theorem. (Author)

AD-443 217 **Field 9B**
CFSTI Price: HC$3.00
UNIVAC, Blue Bell, Pa.
LOW-POWER THIN-MAGNETIC-FILM MEMORY.
Final technical rept., 14 May 63-14 May 64, by T. J. Matcovich. Jul 64, 73p
Contract AF33 (657)-11199,
Proj. AF-4159,
Task 415905
AL TDR-64-151

Descriptors: (*Thin films (Storage devices), Circuits), (*Data storage systems, Design), Performance (Engineering), Computer storage devices.

Identifiers: Computer words, Binary digits.

The study was initiated to determine the feasibility of fabricating circuitry which would be compatible with a lowpower, thin-film, 4-by-4, memory array. For this study, the size of the memory was increased to a 64-by-24 array with the same basic operational characteristics as the 4-by-4 array. A complete memory system was developed around the 64-by-24 array. It included bit and word drivers, a selection matrix, sense amplifier circuits, and the memory array. The circuits are small enough in size to eliminate any requirements for a geometric fanout from the memory array, and they are electronically compatible with the array. The basic memory signal of 500 microvolts is amplified to a level of 0.75 volts. This voltage level is sufficient to drive a standard molecularcircuit data register. With the exception of the transistors in each circuit, the circuits are fabricated completely by evaporation techniques. The transistors are in chip form. Gold wires 0.7 mils in diameter are used for interconnections. The results of this contract demonstrated that a memory system can be fabricated by a continuous process and that the fabrication of the memory array and its associated circuitry can be done with compatible techniques. (Author)

AD-445 031 **Field 9A**
CFSTI Price: HC$2.00
Microwave Associates, Inc., Burlington, Mass.
C- AND KU-BAND SEMICONDUCTOR TR DEVICES.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 64, by R. H. Brunton. 31 Mar 64, 29p
Contract DA-36-039-AMC-03187 (E),
Proj. DA-1G6-22001-A-056
N64 29313

Descriptors: (*Transmitter-receivers, Semiconductor devices), (*Semiconductor devices, Transmitter-receivers), K band, Diodes (Semiconductor), Waveguides, Varator diodes, Radiofrequency power, Radar duplexers, Crystal detectors, Limiters.

All work performed on the Ku-band investigation during this period was concerned with full height Ke-band waveguide diode mounts. PIN and varactor diodes have been measured using forward DC bias to simulate high power isolation and zero bias to provide the low loss condition. Additional work has been carried out utilizing high burn out crystal

detectors to provide the forward bias for the PIN and the varactor during high power tests. High power tests during this quarterly interval resulted in the successful operation of a two stage switched limiter. Operational data is given for peak powers up to 1,000 watts. (Author)

AD-448 744 **Field 9E**
CFSTI Price: HC$2.00
Bendix Corp., Davenport, Iowa. Pioneer-Central Div.
FREQUENCY TEMPERATURE COMPENSATION TECHNIQUES FOR QUARTZ CRYSTAL OSCILLATORS.
Quarterly rept. no. 4, 1 Apr-30 Jun 64.
3 Aug 64, 39p Pub-3051-64
Contract DA-36-039-AMC-02282 (E)

Descriptors: (*Crystal oscillators, Thermal stability), (*Quartz resonators, Crystal oscillators), Frequency, Stability, Frequency stabilizers, Electric networks, Thermistors, Resistors, Theory, Graphics, Analysis.

The use of graphical analysis for TCXO design is discussed. The results of this investigation show that a graphical analysis will not be useable for very accurate compensation because of resolution and parameters that cannot be taken into account with graphs. The techniques for determining compensation networks are discussed. A new technique is described where diodes are used in conjunction with thermistor-resistor networks. The 5 x 10, to the 8th power Group III, TCXO's are discussed. Results of the first compensation attempts are given. The compensation networks and techniques used are presented. (Author)

AD-449 658 **Field 9A**
CFSTI Price: HC$3.00
Field Emission Corp., McMinnville, Oreg.
APPLIED RESEARCH ON FIELD EMISSION CATHODES.
Final rept., 15 Jun 63-15 Jun 64,
by E. E. Martin and F. M. Charbonnier. 15 Jun 64, 84p Rept. no. 8
Contracts DA-36-039-AMC-03266 (E), ARPA Order-123-63,
Proj. DEFENDER,
Task 7776-11-013-38
Continuation of Contract DA-36-039-sc-90829.

Descriptors: (*Cathodes (Electron tubes), Field emission), (*Field emission, Electrodes), Configuration, Material forming, Tungsten, Material removal, Electroerasive machining, Chemical milling, Electron optics, Electron beams, Focusing, Electrostatics, Magnetic fields, Metal coatings, Zirconium, Adsorption, Oxygen, Magnesium, Stability.

Effort under subject contract was toward study of field emission cathodes and their development to a practical electron source. Primary emphasis was on relatively gross structures for use at high power levels. Emission currents to 22 amperes at 390 kilovolts were obtained from single, needle-shaped, tungsten emitters and to 105 amperes at 203 kilovolts from an edge-shaped, tungsten structure. Point cathodes were shown to emit maximum currents in agreement with theoretical prediction based on energy exchange at the cathode and on cathode dimensions. Electrolytic and chemical techniques were developed for fabrication of edge cathodes which were free of cold work and had terminal radii of the order of 0.00001 cm. Electron optical systems appropriate for use with field emitted beams were studied; and basic knowledge of the behavior of adsorbates which improve beam utility by selective emission enhancement in the forward direction was extended.

AD-449 765 **Field 9A**
CFSTI Prices: HC$2.00
Chatham Electronics Div., Tung-Sol Electric, Inc., Livingston, N. J.
SECONDARY EMISSION ELECTRON MULTIPLIER TUBE.
Final interim development rept., 21 Mar 62-15 Oct 63,
by J. McArtney. 15 Oct 63, 46p
Contract Nonr-3807 (00)

Descriptors: (*Electron multipliers, Secondary emission), (*Secondary emission, Electron tubes), Electron tube parts, Metal, Glass, Ceramic materials, Packaging, Configuration, Stability, Time, Graphics, Power, Tests, Life expectancy, Electrodes, Silver alloys, Magnesium alloys.

The design of a high power grid controlled secondary electron emission tube is presented. The advantages of venetial blind cylindrical geometry silver magnesium dynodes are discussed. Various attempts at improving tube characteristics and structure are considered. A discussion of tube instability delay time and rise time, power calculations and tube parameter graphs are included. Life test results, tube application and future tube designs are presented. (Author)

AD-451 430 **Field 9E**
CFSTI Price: HC$2.00
Navy Underwater Sound Lab., New London, Conn.
DYNAMIC COUPLING COEFFICIENTS FOR DISTRIBUTED PARAMETER PIEZOELECTRIC TRANSDUCERS.
by William J. Marshall. 16 Oct 64, 34p USL-622
Projs. USL-1-450-00-00, SF001-03-18,
Task 8044

Descriptors: (*Piezoelectric transducers, Differential equations), Magnetostrictive elements, Mathematical analysis, Integral equations, Vibrators (Electrical), Coupling circuits, Equations of motion.

This report discusses a definition of the effective coupling coefficient for the body-force class of electromechanical transducers. This definition is based on the distribution of energy in the transducer and is therefore particularly applicable to the 'distributed parameter' type of transducer. Furthermore, the definition results in a frequency dependent coupling coefficient which is valid for all modes of vibration. The definition is applied to some common types of longitudinal vibrator and the results are compared with experiments for one particular device (a partially excited stack of ceramic disks). The influence of parasitic elements on the system coupling is also examined.

AD-454 991 **Field 9A**
CFSTI Price: HC$7.55
New York Univ., N. Y. Electron Devices Group.
HYDROGEN THYRATRONS AND MODULATORS, SYMPOSIUM (8th).
Proceedings held 12-14 May 64, Fort Monmouth, N. J.
1964, 452p
Contract DA-28-043-AMC-00039 (E)
N65 17647

Descriptors: (*Thyratrons, Hydrogen), (*Modulators, Hydrogen), Symposia, Degasification, Power, Voltage, Inductance, Circuits, Transformers, Limiters, Electric switches, Cathodes (Electron tubes), Pulse modulation, Antenna arrays.

Contents: Hydrogen Cleanup, Deuterium Versus Hydrogen in Thyratron Modulator Switch Tubes, The Parallel Operation of Hydrogen Thyratrons, HighPower Hydrogen Thyratrons, Experiments with a Symmetrical, Gradient-Grid Thyratron, Recovery in Hydrogen Thyratrons, Inductance Effects in EnergyDiverter Circuits, Electronic Energy Diverter (Crowbar) Design and Application, Size Estimation of High-Power Pulse Transformers in Line-Type Modulators, Pulse Measurement Technique, Floating Deck Trigger Coupling Methods, Computer-Assisted Design of Line-Type Modulators, Pulse Characteristics of a GL-5630 Ignitron, Experimental Investigation of the Energy States of a High-density Gaseous Plasma, Coaxial Triggered Gap Switch, The Artatron, A Sixty-Megawatt Hard-Tube Modulator, Development of a 325-Kilovolt, High-Vacuum Switch Tube, Generation of ShortModulation Pulses Employing Silicon Switches, HardTube Pulse Modulator for AGS Linac RF Power Amplifier, Hydrogen Thyratron Magnetic Pulser and Phased Array Power Modulator.

AD-460 552 **Field 9A**
CFSTI Prices: HC$3.00 MF$0.75
Hughes Aircraft Co., Newport Beach, Calif.
SSB AND VHF CRYSTAL FILTERS.
Quarterly rept. no. 6, 15 Sep-15 Dec 64,
by E. C. Ho and R. H. Tuznik. 15 Dec 64, 89p
Contract DA-36-039-AMC-02305 (E)

Descriptors: (*Crystal filters, Very high frequency), Thermal stability, Sensitivity, Bandpass filters, Sidebands, Manufacturing methods.

In this report the design, fabrication, and test results on developmental ten-crystal equimotional and bimotional crystal filters at 10.5 MC and a ladder crystal filter at 20.0 MC are presented and evaluated. The first efforts in the temperature compensation of crystal filters involving a study phase have been initiated with a discussion of specifications, factors involved in filter temperature stability, temperature sensitivity considerations and minimization, and statistical aspects of the temperature stability problem. (Author)

AD-467 230 **Field 9E, 13J**
CFSTI Prices: HC$3.00 MF$0.50
Navy Marine Engineering Lab., Annapolis, Md.
ANALYSIS OF THERMAL GRADIENT IN SUBMERSIBLE ELECTRIC MOTORS.
Research and development rept.,
by A. B. Harbage. May 65, 54p MEL-89/65
Proj. S-F013 12 15,
Task 4829

Descriptors: (*Electric motors, Underwater equipment), Heat transfer, Mathematical analysis, Underwater, Coils.

The report develops a method of predicting temperature distribution within stators of submersible electric motors. A general equation of heat transfer by conduction is applied to finite subdivisions of the stators. The method is used on two types of stators, a 15-hp random-wound unit without end-turn encapsulation and a 50-hp form-wound unit without end-turn encapsulation. In both cases, the method was easily applied and provided results which indicate low (predicted) temperature gradients for the submersible motor stators under full-load operating conditions. (Author)

AD-467 620 **Field 9E**
CFSTI Prices: HC$5.00 MF$2.25
Naval Air Test Center, Patuxent River, Md. Weapons Systems Test Div.
INVESTIGATION OF VARIATIONS IN ANTENNA CHARACTERISTICS WITH DISTANCE.
Final rept.,
by Oscar B. Horton. 28 Jul 65, 158p WST4-658, Serial-31

Descriptors: (*Antennas radiation patterns, Ranges (Distance)), Tables, Gain, Tests, Azimuth, Antennas.

Variations in fundamental and harmonic antenna pattern and gain measurements as a function of distance were investigated in an attempt to establish an exact near-field far-field criteria. An exact relationship could not be developed due to the large number of parameters involved, however, (d) d squared/ lambda was proven to be an acceptable relationship provided the test antenna is not extremely large. (Author)

AD-468 282 **Field 9E**
CFSTI Prices: HC$1.00 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
THE APPLICATION OF AN OPERATIONAL AMPLIFIER TO THE USE OF PIEZOELECTRIC TRANSDUCERS,
by R. D. Wilson. Apr 65, 25p Memo rept. BRL-MR-1646
Proj. DA-1P014501A33E

Descriptors: (*Feedback amplifiers, Piezoelectric transducers), (*Piezoelectric transducers, Feedback amplifiers), (*Current amplifiers, Piezoelectric transducers), Coaxial cables, Attenuation, Recording systems, Signals, Voltage, Capacitance, Gain, Frequency.

The purpose of this report is to discuss and to illustrate how the application of an operational amplifier in a recording system using piezoelectric transducers and long coaxial cable lengths overcomes the problem of low signal due to cable attenuation. (Author)

ANL-7052 **Field 9B, 18K**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
A PERTURBATION PROGRAM WRITTEN IN FORTRAN,
by Louis C. Kvitek. Jun 65, 47p
Contract W-31-109-eng-38

Descriptors: (*Programming (Computers), Perturbation theory), (*Reactor kinetics, Programming (Computers)).

C13.46-262-A **Field 9C**
CFSTI Price: MF$0.75
National Bureau of Standards, Boulder, Colo. Radio Standards Lab.
ACCURACY IN ELECTRICAL AND RADIO MEASURE- MENTS AND CALIBRATIONS, 1965.
Technical note,
by R. C. Powell. 15 Jun 65, 92p
NBS TN-262-A
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.50.

Descriptors: (*Measuring devices (Electrical +electronic), Calibration), (*Electrical engineering, Measuring devices (Electrical+electronic)), Electrical equipment, Electronic equipment, Standards.

NBS estimates of uncertainties associated with physical measurements, and with some NBS calibration services, are shown by 42 provisional 'accuracy charts.' Each chart is accompanied by a facing page giving a brief statement of the state of the art and tentative plans for NBS work in areas where improvement is needed. (Author)

N66-10323 **Field 9C**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
EQUIVALENT NOISE BANDWIDTH ANALYSIS FROM TRANSFER FUNCTIONS.
Technical note,
by Thomas J. Karras. Nov 65, 43p NASA-TN-D-2842

Descriptors: (*Signal-to-noise ratio, Band-pass filters), (*Band-pass filters, Signal-to-noise ratio).

Patent 3,216,208 **Field 9C, 20M**
MEANS FOR MAINTAINING LONG LENGTHS OF WIRE OR FILMS AT CRYOGENIC TEMPERATURES.
Patent assigned to Air Force,
by Alfred J. Cummings. 9 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Superconductors, Temperature control), (*Wire, Cryogenics), (*Films, Cryogenics), Transmission lines, Superconductivity, Electronic equipment, Patents.

The apparatus is suitable for use with delay or other transmission lines and maintains a wire at cryogenic temperatures to attain superconductivity. The apparatus allows for the cooling of a wire film or tape on a spool which is formed of a portion of the cryostat. The cryostat has a filling tube through which the cryogenic fluid is inserted. The wire is maintained at cryogenic temperatures without submerging in the cooling fluid.

PB-168 887 **Field 9B, 5B**
CFSTI Prices: HC$1.00 MF$0.50
International Business Machines Corp., San Jose, Calif.
PRINCIPLES OF INFORMATION STORAGE AND RETRIEVAL USING A LARGE SCALE RANDOM ACCESS MEMORY,
by J. J. Nolan. 17 Nov 58, 15p
Prepared for presentation at American Chemical Society, San Francisco, Calif., 15 Apr 1958.

Descriptors: (*Computer storage devices, Information retrieval), (*Information retrieval, Computer storage devices), Reports, Analysis, Subject indexing, Search theory.

Identifiers: Key words, Coding (Documentation), Random access techniques.

The paper reports on the preliminary investigation of a relatively new device - large scale, random access memory - and its use as an information retrieval tool. Some proposed changes in systems, procedures, coding and searching methods will be described using the IBM 305 RAMAC as an information searching machine. (Author)

PB-168 943 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Co., Seattle, Wash. Aero-Space Div.
Z ANGLE METER 310A, 310B (ACTON LABORATORIES, INC.),
Technical manual instrument calibration procedure, AZ-15.
1 Oct 65, 15p
Contract N123 (62861)35056A
NAVWEPS 17-20AZ-15
Supersedes NAVWEPS-17-20AZ-15 dated 1 Jan 65.

Descriptors: (*Test equipment (Electronics), Calibration), (*Electrical impedance, Test equipment (Electronics)), Meters, Phase meters, Phase measurement, Instruction manuals, Test methods.

Identifiers: AZ-15 impedance meter.

This procedure has been prepared specifically for those laboratories participating in the Navy Calibration Program. The government assumes no responsibility for its use by other agencies. The instruments utilized in this procedure were selected from those known to be at the disposal of the participating laboratories, and the listing by make and model number carries no implication of preference, recommendation, or approval by the Navy for use by other agencies. It is recognized that equivalent equipment produced by other manufacturers may be capable of equally satisfactory performance in the procedure.

PB-168 944 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Co., Seattle, Wash. Aero-Space Div.
TIME MARK GENERATOR, MODEL 181 (TEKTRONIX, INC.)
Technical manual instrument calibration procedure, AG-94.
15 Oct 65, 10p
Contract N123 (62861)35056A
NAVWEPS 17-20AG-94
Supersedes NAVWEPS-17-20AG-94 dated 1 Mar 65.

Descriptors: (*Timing devices, Calibration), (*Test equipment (Electronics), Timing devices), Instruction manuals, Test methods.

The manual describes the calibration procedure for the Tektronix, Inc. 181 Time Mark Generator. The Test Instrument provides accurate time markers, which can be displayed on an oscilloscope for the purpose of sweep calibration or for comparison time measurements.

PB-168 973 **Field 9B, 9D**
CFSTI Prices: HC$3.00 MF$0.75
Purdue Univ., Lafayette, Ind. Electronic Systems Research Lab.
ON RECEPTION OF SIGNALS FOR CHANNELS HAVING MEMORY,
by J. C. Hancock and R. W. Chang. Oct 65, 96p
Technical rept. TR-EE-65-19
Grant NSF-GP-2898,
Proj. PRF-3955

Descriptors: (*Learning machines, Digital systems), (*Pulse communication systems, Information theory), Signals, Interference, Data transmission systems, Signal-to-noise ratio, Optimization, Probability, Computer logic.

Intersymbol interference is one of the main difficulties encountered in high speed digital communications. The first part of this work is concerned with m-ary (m > or = 2) channels with intersymbol interference between L bauds (L > or = 2). Signal waveforms are assumed known. Sequential receiver structures are developed for making joint optimum (minimum probability of error) decision about H (H > or =L) consecutive symbols on the basis of the complete message received. Learning receiver structures are developed for binary channels with intersymbol interference between two adjacent bauds under the conditions that: signal waveforms are unknown but satisfy a practical condition; test or reference signal is not available; additive noise is present in the channel. An optimum unsupervised learning receiver is obtained for the case where the a priori probability density function of the unknown parameters is available. Binary channesl with unknown signal waveforms and intersymbol interference between L (L > or = 2) bauds are considered. It is seen that, in general, the received message cannot be classified in a unique manner if no condition is imposed on the unknown parameters.

PB-169 018 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Co., Seattle, Wash. Aero-Space Div.
DIFFERENTIAL VOLTMETER 825A, 825AR, 825A/AG, 825AR/AG (JOHN FLUKE MANUFACTURING CO.).
Technical manual instrument calibration procedure, AE-31.
1 Sep 65, 18p
Contract N123 (62861)35056A
NAVWEPS 17-20AE-31

Descriptors: (*Voltmeters, Calibration), Test equipment (Electronics), Instruction manuals, Test methods.

The manual describes the calibration procedure for the John Fluke Manufacturing Company Models 825A, 825AR, 825A/AG, and 825AR/AG Differential Voltmeters. The Test Instrument is capable of measuring direct voltage to 500.00 volts without loading error. In addition, the Test Instrument is capable of being used as a conventional voltmeter and a megohmmeter. The 'G' in the model number denotes the use of a zener diode reference in place of a standard cell.

PB-169 020 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
MICROPHONE SIMULATOR SET AN/URM-14 (SM-30/URM-14).
Technical manual instrument calibration procedure, AE-49.
15 Sep 65, 7p NAVWEPS-17-20AE-49

Descriptors: (*Microphones, Simulators), (*Test equipment (Electronics), Calibration), Transmitter-receivers, Instruction manuals, Test methods.

The manual describes the calibration procedure for the AN/URM-14 (SM-30/URM-14) microphone simulator set which is used to measure the level of voltage that is applied to the microphone-input circuit of transmitter-receivers having carbonmicrophone inputs.

PB-169 021 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
SIGNAL GENERATORS TS-155/UP, TS-155A/UP, TS-155B/UP, TS-155C/UP, TS-155E/UP.
Technical manual instrument calibration procedure, GQ-06.
1 Aug 65, 19p NAVWEPS-17-20GQ-06

Descriptors: (*Signal generators, Calibration), Pulse generators, Radiofrequency generators, Power meters, Instruction manuals, Test methods.

The manual describes the calibration procedure for the TS-155/UP, TS-155A/UP, TS-155B/UP, TS-155C/UP, or TS-155E/UP signal generator. The Test Instrument consists of a portable, pulse modulated RF generator and a power monitor. The internal pulse generator may be triggered by internal or external signals. The power monitor will indicate average power at levels of from 0 to 200 milliwatts.

PB-169 024 **Field 9C, 17I**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
RADAR TEST SET AN/UPM-44 (TS-768/UPM-44), AN/UPM-44A (TS-768A/UPM-44, AN/UPM-44B (TS768B/UPM-44), AN/UPM-44C (TS-768C/UPM-44).
Technical manual instrument calibration procedures, GQ-13.
15 Oct 65, 36p NAVWEPS-17-20GQ-13

Descriptors: (*Radar equipment, Test sets), (*Test sets, Calibration), Spectrum analyzers, Synchronization (Electronics), Frequency meters, Power meters, Signal generators, Instruction manuals, Test methods.

The manual describes the calibration procedure for the AN/UPM-44, AN/UPM-44A, AN/UPM-44B, and AN/UPM44C radar test sets, which consist of the TS-768, TS768A, TS-768B, and TS-768C radar test sets, respectively, including transit cases, accessory cables, adapters etc. The only item which normally requires calibration is the TS-768 ( ) radar test set, which will be referred to herein as the Test Instrument. The primary functions combined in the test set are a frequency meter, power meter, signal generator, spectrum analyzer, and a general purpose synchroscope. The TS-768C/UPM-44C has been selected as a specimen instrument in the performance of this procedure. Due to differences in frequency tolerance, a separate checklist is provided for the frequency dial calibration of the AN/UPM-44, A, and B model instruments.

PB-169 025 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
OSCILLOSCOPE 512 (TEKTRONIX).
Technical manual instrument calibration procedures, AW-39.
15 Sep 65, 23p NAVWEPS-17-020AW-39

Descriptors: (*Oscilloscopes, Calibration), Test equipment (Electronics), Instruction manuals, Test methods.

The manual describes the calibration procedure for the Tektronix 512 oscilloscope. The Test Instrument is a general purpose laboratory oscilloscope which has an internal square-wave calibrator, calibrated vertical sensitivity and sweep speeds, and internal and external triggering circuits.

PB-169 118 **Field 9C, 4B**
CFSTI Prices: HC$1.00 MF$0.50
Burroughs Corp., Radnor, Pa.
TEST SET TS-538/U, TS-538A/U, TS-538B/U, TS-538C/U.
Technical manual instrument calibration procedure GQ-24.
1 Nov 65, 20p
Contract N123 (62861)35057A
NAVWEPS 17-20GQ-24

Descriptors: (*Radiosondes, Test sets), (*Test sets, Calibration), Signal generators, Frequency meters, Power meters, Radio equipment, Instruction manuals, Test methods.

The manual contains the information necessary for calibrating the TS-538 ( )/U Test Set. This portable instrument can be used in the frequency range of 1630 to 1730 megacycles (1615 to 1715 megacycles for the TS-538C/U) as a signal generator, frequency meter, and power monitor. It is used in testing the operation of radiosonde equipment, in checking the power output of transmitters, and in checking the bandwidth, alignment, and sensitivity of receivers.

PB-169 119 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
Metrology Engineering Center, Bureau of Naval Weapons Representative, Pomona, Calif.
VOLTAGE STANDING WAVE RATIO 3/8 INCH COAXIAL INSTRUMENTS WITH TYPE N CONNECTORS, FREQUENCY RANGE, 1.05 TO 10.0.
Technical manual instrument calibration procedure, GV-09.
1 Oct 65, 15p
NAVWEPS 17-20GV-09
Supersedes NAVWEPS-17-25HV-06, 22 Aug 60; NAVWEPS-17-25HV-07, 21 Nov 60; and NAVWEPS17-25HV-08, 31 Jan 61.

Descriptors: (*Standing wave ratios, Measuring devices (Electrical ; electronic)), (*Measuring devices (Electrical ; electronic), Calibration), Extremely high frequency, Voltage, Instruction manuals, Test methods.

The manual describes the measurements procedure for the voltage standing wave ratio (VSWR) of 3/8 inch coaxial instruments having type N connectors, at frequencies of from 0.1 to 10.0 GHz. Appendix A contains a list of instruments which may be calibrated by this procedure, and includes the manufacturer's maximum acceptable VSWR for each instrument. This procedure can also be used for measuring the VSWR of other 3/8 inch coaxial instruments at frequencies of from 0.1 to 10.0 GHz.

10. ENERGY CONVERSION (NON-PROPULSIVE)

AD-406 355 **Field 10A, 10B**
CFSTI Price: HC$3.00
Stanford Univ., Calif.
DIRECT ENERGY CONVERSION SYSTEMS.
Semi-annual technical summary rept. no. 3, 1 Oct 62-1 Apr 63,
by Charles H. Kruger. 30 Apr 63, 58p
Contract AF49 (638)-1123, ARPA Order-246-62
N64 32867

Descriptors: (*Energy conversion, Scientific research), (*Thermoelectricity, Energy conversion), (*Magnetohydrodynamics, Energy conversion), (*Fuel cells, Energy conversion), (*Electrochemistry, Energy conversion), Electric power production, High temperature research. Plasma physics, Calibration, Shock tubes, Electrodes, Single crystals, Instrumentation, Interferometers, Magneto optic effect, Electrolytes, Electrical impedance, Mathematical analysis, Measurement.

Contents: Magnetogasdynamics, Channel, Shock tube, Fuel cells, Kinetic studies, Chemisorption studies, Thermoelectricity, Basic materials research, Measurements at elevated temperatures, Transient performance of thermoelectric generators.

AD-435 833 **Field 10C**
CFSTI Price: HC$1.00
Mallory (P. R.) and Co., Inc., Burlington, Mass. Lab. for Physical Science.
CELL EQUALIZATION TECHNIQUES.
Quarterly technical progress rept., 1 Jan-1 Mar 64,
by F. J. Cocca. 1 Mar 64, 18p
Contract AF33 (615)-1342

Descriptors: (*Batteries+components, Stabilization), (*Alkaline cells, Stabilization), Control systems, Circuits, Heat transfer, Thermal insulation, Transistors, Diodes (Semiconductor), Germanium.

Identifiers: Stabistors.

There are two modes of operation for a stabistor charge control circuit (1) thermal coupling the stabistor to the cell and (2) thermal isolation of the stabistor from the cell. Thermal coupling was demonstrated in circuits BCC-2 and BCC-3, where the former cycled for 2700 cycles and the latter for 785 times. Preliminary investigations indicate that a germanium power transistor may be used more effectively as an antireversal diode than the germanium diode now being used. Attempts to fabricate a backward diode were fruitless; it is very difficult to fabricate a device with backward diode characteristics across a large area junction. (Author)

AD-444 798 **Field 10C**
CFSTI Price: HC$3.00
Yardney Electric Corp., New York.
DEVELOPMENT OF THE SEALED ZINC-SILVER OXIDE SECONDARY BATTERY SYSTEM.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 64,
by Martin Sulkes and George A. Dalin. 31 Mar 64, 83p
Contract DA-36-039-AMC-02238 (E),
Proj. DA-3A99-09-022
See also AD-600 395.

Descriptors: (*Storage batteries, Zinc), (*Alkaline cells, Storage batteries), Life expectancy, Batteries+components, Recombination reactions, Silver, Oxides, Battery separators.

The maximum useful life at 120 F was 2-3 months for cell - built with the standard separator system. The cycling regime had very little effect on high temperature cycle life. The capacity maintenance of scaled cells was approximately 25% better than unsealed cells of identical construction. Studies of the reaction of oxygen with zinc in sealed cells showed that the lower the electrolyte concentration the higher the recombination rate. Rotating disc electrode studies showed that the recombination reaction is kinetically limited. The recombination reaction was found to be potential dependent. At only the highest potentials, i.e., - 1.59 vs Hg0, did the reaction rate begin to approach the value calculated for diffusion control. The recombination rate of hydrogen with a Ag0 battery plate was measured. Measurements of pressure increases at 160 F indicate that the rate of hydrogen recombination increases with temperature at least as rapidly as hydrogen evolution. Data are presented on the physical, chemical and electrical properties of some separator materials. Non-reactive separators such as RAI XPE 40/50 or XTPE 40/50 have poor silver stopping properties. A reactive separator such as cellophane is required to prevent silver transport. (Author)

AD-453 792 **Field 10C**
CFSTI Price: HC$3.00
Yardney Electric Corp., New York.
DEVELOPMENT OF THE SEALED ZINC-SILVER OXIDE SECONDARY BATTERY SYSTEM.
Quarterly progress rept. no 4, 1 Apr-30 Jun 64,
by Martin Sulkes and George A. Dalin. 30 Jun 64, 53p
Contract DA-36-039-AMC-02238 (E),
Proj. DA-3A99-09-022
N65 15759
See also AD-444 798.

Descriptors: (*Storage batteries, Performance (Engineering)), (*Batteries+components, Storage batteries), Alkaline cells, Zinc, Silver, Battery separators, Hermetic seals, Electric discharges, Oxides, Permeability, Potassium compounds, Hydroxides, Electrodes.

Nine months wet discharged stand did not affect the performance of sealed cells except for the first

cycle after the stand. Sealed cells gave improved cycle life and capacity maintenance over unsealed cells of the same construction. Data are presented on the physical and chemical properties of some separators. Several separator materials were found which have appreciably lower rates of reaction with silver than C19 (300) but show no higher penetration by silver. Negative electrode shape change was reduced and cycle life increased by the use of low concentrations of KOH, i.e., 26.5% with an all PVA separator. With a C19 (300 separator, cycle life falls as the electrolyte concentration is lowered, due to increased chemical attack on the separator even though shape change is reduced. Good capacity was obtained at high rates of charge by the use of either 6 or 11 mil Pellon interseparator and/or a highly porous positive electrode. Cells were built with various amounts and types of negative electrode binders. Cells were built with continuous cadmium grids in the negative electrode. (Author)

AD-457 834 **Field 10C**
CFSTI Price: HC$3.00
Yardney Electric Corp., New York.
DEVELOPMENT OF THE SEALED ZINC-SILVER OXIDE SECONDARY BATTERY SYSTEM.
Quarterly progress rept. no. 5, 1 Jul-30 Sep 64,
by Martin Sulkes and George A. Dalin. 30 Sep 64, 69p
Contract DA-36-039-AMC-02238 (E),
Proj. DA-3A99-09-022
See also AD-453 792.

Descriptors: (*Storage batteries, Zinc), (*Alkaline cells, Storage batteries), Batteries+components, Battery separators, Silver, Oxides, Electrolytes, Tests.

The rate of reaction of silver oxides with PVA and C19 separator was determined as a function of time. A complete analysis is given for the data obtained from the evaluation cycling of the 32 cells constructed for the free electrolyte quantity and concentration, interseparator and silver density experiment. The results of the evaluation cycling and failure analysis are given for the 24 cells constructed for the separatorelectrolyte concentration experiment. Cells built with RAI XPE and XC irradiated separators gave low performance. The results of the evaluation cycling are given for the 9 cells constructed for the cell design experiment, and for 14 cells constructed for the negative binder-amalgamation experiment. Initial capacity was higher with a mold pressed negative than with a posted one, however, capacity did equalize after 10 cycles. Six cells with various types of cadmium grids in the negative electrode have completed evaluation cycling. Twelve sealed 12 AH cells are being constructed for operation on the Ag-I level only. The cells have twice the normal quantity of silver and Pb, Pd and Pd-Pb additives. (Author)

AD-460 354 **Field 10A**
CFSTI Price: HC$2.00
Texas Instruments, Inc., Dallas.
EXTENDED MOLTEN-CARBONATE FUEL CELL SYSTEM PROGRAM.
Quarterly progress rept. no. 2, 24 Oct 64-1 Jan 65,
1 Jan 65, 39p TI-08-65-07
Contract DA-44-009-AMC-54T

Descriptors: (*Fuel cells, Carbonates), Melting, Design, Operation, Costs.

The operating characteristics of a compact, low-cost design of the fuel cell system.

AD-467 809 **Field 10B, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Navy Marine Engineering Lab., Annapolis, Md.
HEAT TRANSFER BETWEEN SOLIDS.
Research and development rept.,
by Robert P. Kolb. Jul 65, 16p MEL-157/64
Proj. S-ROLL 01,
Task 0401

Descriptors: (*Heat transfer, Surfaces), (*Thermoelectricity, Generators), (*Surfaces, Thermoelectricity), Thermal conductivity, Pressure, Lubrication, Aluminum alloys, Titanium, Mica, Surface temperature, Surface properties, Loading (Mechanics), Solids.

In attempts to improve thermal performance of modules for thermoelectric generators an investigation based upon a program of experimentation in thermal conductance between plane solid surfaces in both dry and lubricated contact under pressure was conducted. Surface materials were Type 6061-T6 aluminum alloy and Type RS-70 unalloyed titanium. In some tests a 0.0027-inch mica layer was interposed between the metallic surfaces, with dry contact. Values of conductance were determined over a range of imposed pressures between 5 and 225 pounds per square inch (psi) in most cases, otherwise at a single pressure of approximately 100 psi. Disparate results led to the conclusion that conductance may be related to the hardness as well as the roughness of the contacting surfaces. Curves of conductance versus imposed pressure usually have a point of inflection at which they change from convex to concave upward, with rising pressure. It was established that the higher the value of surface roughness, the lower the pressure at which the point of inflection occurs. A lubricated-contact aluminum/aluminum joint showed a conductance at 100 psi, approximately six times the drycontact value. A dry-contact joint with the specified mica layer interposed showed a conductance approximately 1/6 the original metal-to-metal value. Results for a variety of surface material combinations are presented in a tabulation arranged for comparative study. (Author)

AD-467 988 **Field 10C**
CFSTI Prices: HC$1.00 MF$0.50
Navy Marine Engineering Lab., Annapolis, Md.
AUTOMATIC BATTERY FORMATION CYCLER AND CONTROLLER.
Research and development rept.,
by Floyd E. Ford. Jul 65, 21p MEL-50/65
Proj. S-12730-G

Descriptors: (*Batteries+components, Monitors), (*Electrolytic cells, Capacitance), (*Monitors, Batteries+components), Silver, Cadmium, Power supplies, Control, Automatic, Satellites (Artificial), Instrumentation, Voltage, Battery charges, Design.

An automatic cycler and controller has been designed to determine charge capacity and perform appropriate charge/discharge operations on electrochemical cells intended for use as satellite power sources. This device is capable of monitoring up to 20 series-connected cells at a time and characterizing each cell according to its terminal voltage and ampere-hour capacity. (Author)

ANL-7039 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
EVALUATION OF A THERMIONIC ENERGY CONVERTER USING FILM-BOILING LIQUID METAL,
by A. J. Ulrich. May 65, 25p
Contract W-31-109-eng-38

Descriptors: (*Thermionic converters, Film boiling), (*Film boiling, Liquid metals).

11. MATERIALS

ACF-7 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
ACF Industries, Inc., Albuquerque, N. Mex.
A CRITICAL EVALUATION OF NITROGEN IN 304 ELC STAINLESS STEEL USING THE PLATINUM FLUX TECHNIQUE,
by Kenneth J. Curry. 28 Apr 65, 7p CONF-650438-1
Contract AT (29-1)-1352
Prepared for presentation at Analytical Chemistry Conference, Albuquerque, N. Mex.

Descriptors: (*Stainless steel, Chromatographic analysis), (*Nitrogen, Stainless steel).

AD-282 039 **Field 11B, 11F**
CFSTI Price: HC$6.00
Research and Advanced Development Div., AVCO Corp., Wilmington, Mass.
THERMODYNAMICS OF CERTAIN REFRACTORY COMPOUNDS. Vol. 2. BIBLIOGRAPHY OF CODED REFERENCES,
by R. J. Barriault, S. L. Bender, R. E. Dreikorn, T. H. Einwohner and R. C. Feber. May 62, 300p
Contract AF33 (616)-7327,
Projs. AF-7350, AF-7381,
Tasks 73500, 73812
ASD TR-61-260-Pt-1-Vol-2
See also AD-278 633.

Descriptors: (*Refractory compounds, Thermodynamics), (*High-temperature research, Refractory materials), (*Ceramic materials, Thermodynamics), Oxides, Borides, Carbides, Nitrides, Gases, Metals, Carbon, Nitrogen, Oxygen, Refractory metals, Alkaline earth metals, Transition elements, Boron, Heat of formation, Preparation, Stability, Tables, Experimental data, Bibliographies.

AD-297 876 **Field 11B, 20F**
CFSTI Price: HC$3.00
Servo Corp. of America, Hicksville, N. Y.
INVESTIGATE THE PROPERTIES OF GLASSES TRANSMITTING IN THE 8 TO 14 MICRON REGION.
Final technical rept.,
by C. J. Billian. 2 Jan 63, 75p SCA-34300
Contract Nonr3647 (00), ARPA Order-269-62,
Proj. DEFENDER

Descriptors: (*Infrared optical materials, Glass), (*Glass, Infrared optical materials), Sulfur, Selenium, Electromagnetic properties, Arsenic, Tellurium, Optics, Optical properties, Test equipment, Test methods, Electrical properties, Refractive index, Thermal expansion, Stability.

Information is presented on new, non-oxide, IR transmitting glasses selected from the composition field of As-S-Se-Te. The primary selection criteria were softening temperature in excess of 100 C and good optical transmittance in the 8 to 14 micron region of the electro-magnetic spectrum. Results on systematic composition series show that the primary requirements of softening point and IR transmittance are satisfied if the compositions are limited to the As-Se-Te field. Sulfur inhibits the IR transmittance producing a 10% cut-off at approximately 13.5 microns, whereas glasses containing As-Se-Te transmit well out to 16 microns. A wide range of compositions was selected to obtain 20 glasses representing a spread in optical and physical properties. Procedures, methods and results for the initial selection of glasses, properties obtained, property measurements and equipment used to conduct the various measurements are described. Compositions, optical, chemical, electrical and physical properties are presented for 20 glasses. (Author)

AD-440 439 **Field 11B**
CFSTI Price: HC$2.00
Texas Instruments, Inc., Dallas.
NEW HIGH TEMPERATURE INFRARED TRANSMITTING GLASSES.
Semiannual technical summary rept. no. 3, 1 Nov 63-30 Apr 64,
by Maurice J. Brau and A. Ray Hilton. 30 Apr 64, 36p TI-08-64-78
Contract Nonr-3810 (00)
N64 25829
Prepared in cooperation with ARPA.

Descriptors: (*Glass, Infrared optical materials), (*Infrared optical materials, Glass), (*Infrared windows, Glass), Phosphorus, Germanium, Tellurium, Silicon, Arsenic, Antimony, Sulfur, Selenium, Tin, Chalcogens, Refractory materials, Phase studies, Thermal properties, Hardness, High-temperature research, Refractive index.

Glasses formed in the Ge-P-Te system have moderately high softening points (as high as 390C) and are essentially transparent to the infrared out to 20 microns wavelength. Their refractive indexes are greater than 3, and their glass-forming composition region is the smallest of all the systems evaluated. We found no ternary glass system using the group IVA element Sn that should be evaluated. With the Si-As-Te and GeAs-Te glass systems as bases, the effect on the optical properties, softening point, and hardness was determined when P, Sb, S, and Se were substituted into the glasses. Efforts to definitely establish the origin of the undesirable absorptions in the most promising glasses will increase. Prisms made from these glasses will be cast and the refractive index accurately measured. Blending studies will continue. (Author)

AD-446 416 **Field 11F, 13J**
CFSTI Price: HC$3.00
Navy Marine Engineering Lab., Annapolis, Md.
DEVELOPMENT OF TITANIUM ALLOYS FOR HULLS OF DEEP-DIVING VEHICLES.
Research and development rept., phase 1,
by I. R. Lane, Jr. 31 Aug 64, 53p MEL-194/64

Descriptors: (*Titanium alloys, Submarine hulls), (*Submarine hulls, Titanium alloys), Deep submergence, Aluminum alloys, Niobium alloys, Tantalum alloys, Toughness, Welding, Metal plates, Ship plates, Tensile properties, Reviews, Material forming, Heat treatment.

A summary is presented of progress on the alloy-development and physical-metallurgy aspects of a program for demonstrating the feasibility of using titanium alloys for hulls of deep-diving vehicles. The program was aimed at obtaining near-alpha-type alloys with good toughness and fabricability at a yield strength of 120 KSI. A minor effort was also made to explore higher-strength alloys. Much of the work was accomplished by contract. Several alloys approached the target properties, but not with consistency. The lack of consistency was associated with inadequate knowledge of optimum mill-processing schedules and physical-metallurgy kinetics. Study of these aspects is now under way. Even though problems remain to be solved, however, the progress to date indicates that it is feasible to use titanium alloys for deep-diving hulls. At least one alloy (Ti-7Al-2Cb-1Ta) can now be considered satisfactory, at a minimum yield strength of 105 ksi, for research-type submersibles. The near future should provide a yield strength between 115 and 120 ksi, plus a choice of additional alloys. (Author)

AD-451 073 **Field 11I, 11D, 13H, 13J**
CFSTI Price: HC$2.00
Naval Ordnance Lab., White Oak, Md.
THE WINDING AND CURING OF LARGE REINFORCED PLASTICS STRUCTURES.
Interim rept.,
by Marlin A. Kinna and Robert W. Warfield. 2 Oct 64, 27p NOLTR-64-162
Task BuWeps RREN-ST-204/212-5/0000

Descriptors: (*Composite materials, Filament wound construction), (*Filament wound construction, Composite materials), (*Plastics, composite materials), Aging (Materials), Winding, Glass textiles, Reinforcing materials, Submarine hulls, Deep submergence, Resistance (Electrical), Epoxy plastics, Quality control.

This report contains data and test results leading to the development of a technique for monitoring the cure of large plastics structures. The technique makes use of a Continuous Current Monitoring Device (CCMD) to follow the cure. The results of this study showed that CCMD techniques are feasible when applied to large continuous fiber reinforced plastics composite structures. In addition, it was demonstrated that the fabrication of large structures, complete with cure monitoring cells as required, can be carried out without difficulty. The technique is recommended as a standard method for following the curing process in large filament wound structures.

AD-453 303 **Field 11D, 11F, 13H**
CFSTI Price: HC$3.00
Horizons, Inc., Cleveland, Ohio.
REINFORCEMENT OF NICKEL CHROMIUM ALLOYS WITH SAPPHIRE WHISKERS.
Final rept., 28 Oct 63-27 Oct 64,
by Richard W. Sicka, Theodore Harkulich, Mark S. Vukasovich and Robert H. Kelsey. 27 Oct 64, 56p
Contract NOw-64-0125-c
N65 15752

Descriptors: (*Composite materials, Fiber metallurgy), (*Ceramic fibers, Refractory metal alloys), (*Whiskers (Crystals), Reinforcing materials), Nickel alloys, Chromium alloys, Single crystals, Sapphires, Vapor plating, Additives, Cladding, Vacuum apparus, Iron, Titanium compounds, Oxides, Aluminum compounds, Metal coatings.

A program of research was conducted to secure a refractory metal-alumina single crystal fiber composite having high fiber loading (about 30 v/o) and exhibiting high strength reinforcement of iron or nichrome by inclusion of additives to the system prior to and during the fusion formation of the composite. Additives have been presented as claddings on the fiber, as inclusions in the metal matrix, as special atmospheres during the malting of the metal phase and as oxide reactive additives serving as fluxing agents. Vacuum metallizing of the fibers prior to their inclusion in composite showed considerable promise for forming a homogeneous ingot by a method of hot pressing. (Author)

AD-455 069 **Field 11B, 11D, 11F, 20M**
CFSTI Price: HC$7.05
Battelle Memorial Inst., Columbus, Ohio.
THERMAL PROPERTIES OF HIGH-TEMPERATURE MATERIALS,
by W. D. Wood and H. W. Deem. 1 Jun 64, 405p
Contract DA-01-021-AMC-203 (Z)
RSIC 202,
N65 15174

Descriptors: (*Heat-resistant materials, Thermal properties), (*Heat-resistant metals + alloys, Thermal properties), (*Ceramic materials, Thermal properties), (*Composite materials, Thermal properties), (*Thermodynamics, Heat-resistant materials), Molybdenum alloys, Niobium alloys, Titanium alloys, Zirconium alloys, Borides, Carbides, Graphite, Nitrides, Silicides, Oxides, Cermets, Graphics, Specific heat, Thermal expansion, Thernal conductivity, Hightemperature research, Reviews.

This report is a compilation of specific-heat, thermalexpansion, and thermal-conductivity data for materials of possible structural usefulness above 2500 F. Data are presented graphically with notations as to measurement methods and test conditions. Prominent laboratories currently making thermal-property measurements are identified. (Author)

AD-455 770 **Field 11D, 11F, 13H**
CFSTI Price: HC$2.00
General Electric Co., Philadelphia, Pa. Missile and Space Div.
INVESTIGATION OF BONDING IN OXIDE-FIBER (WHISKER) REINFORCED METALS.
Final technical rept., 1 Jul 62-30 Jun 64,
by Willard H. Sutton. 30 Jun 64, 45p
Contract DA-36-034-ORD-3768 (Z),
Proj. DA-1-H-0-24404-A-11
AMRA CR-63-01/8,
N65 23591

Descriptors: (*Composite materials, Fiber metallurgy), (*Fiber metallurgy, Bonding), (*Whiskers (Crystals), Reinforcing materials), (*Ceramic fibers, Nickel alloys), Sapphires, Additives, Surface properties, Aluminum alloys, Copper alloys, Indium alloys, Titanium alloys, Zirconium alloys, Chromium alloys, Substrates, Shear stresses, Surface-active substances, Oxides, Aluminum compounds.

The effects of various additives to nickel on its wetting, its interfacial energy and its adherence to sapphire (alpha-A12O3) were investigated by preparing special binary alloys containing one atomic percent of Al, Cu, In, Ti, Zr and Cr. Sessile drop experiments were conducted in vacuo (0.000005 Torr) at 1470 C to 1550 C in order to observe the contact angles and the degree of wetting. Only the nickel drops containing Ti, Zr, and Cr showed evidence of pronounced chemical reaction with the sapphire substrates. These same compositions had the most significant effects on contact angle and interfacial energy. Shear tests were conducted on solidified sessile drops of nickel and nickel alloys, and shear stresses as high as 25,000 psi were recorded. It is concluded that high strengths between metal and oxide systems can be achieved by optimization of the compositions and chemical reactions of the interfacially active elements. (Author)

AD-457 621 **Field 11C, 7E**
CFSTI Price: HC$2.00
Melpar, Inc., Falls Church, Va.
RESEARCH ON PHOTOTROPIC BEHAVIOR OF MATERIALS FOR FLASH BLINDNESS PROTECTION.
Triannual rept. no. 1,
by Sol S. Nelson. Nov 64, 38p
Contract DA-19-129-AMC-389 (N),
Proj. DA-1K0-24401-A11B

Descriptors: (*Dyes, Photochromism), (*Flashblindness, Inhibition), Purine alkaloids, Naphthalenes, Axines, S-heterocyclic compounds, Reduction (Chemistry), Photochemistry.

Identifiers: Phototropic materials, Thiazine dyes.

Five thiazines, two xanthines and a naphthalene derivative were qualitatively screened for application to flashblindness protection. The xanthines, fluorescein and rhodamine were dropped after preliminary studies indicated that the leuco form was unstable. The naphthalene, naphthol yellow S was examined perfunctorily, and no conclusions have, as yet, been reached. The thiazines were methylene blue, methylene green, azure A, azure B, and azure C. The thiazenes showed desirable properties in that they were readily reduced to a leuco form which was then oxidized to the colored form by a flash of light. Reduction was accomplished by chemical means (Zn and HC1) and by electrolytic methods. Studies were begun on the mechanism of the reduction and the subsequent photooxidation. The first step in these studies was the purification of commercial methylene blue in order to isolate the component of interest. This purification was accomplished by thin layer chromatography in acid and basic solvents and by recrystallization. The data suggest the existence of an equilibrium between differently charged cationic dye species. (Author)

AD-458 231 **Field 11C, 7E**
CFSTI Price: HC$2.00
Naval Civil Engineering Lab., Port Hueneme, Calif.
DEGRADATION OF ORGANIC COATINGS BY IRRIDATION WITH LIGHT. I. VOLATILE PRODUCTS FROM ULTRAVIOLET IRRADIATION IN AIR,
by Peter J. Hearst. 31 Dec 64, 36p Technical note N-685
Proj. Y-R011-01-01-021

Descriptors: (*Organic coatings, Photolysis), (*Plastic coatings, Photolysis), (*Vapors, Spectra (Infrared)), Ultraviolet radiation, Polyester plastics, Oils, Vinyl plastics, Acetates, Epoxy plastics, Amino plastics, Polyamide plastics, Degradation, Absorption spectrum, Carbon dioxide, Films.

Identifiers: Polyvinyl acetates.

Various clear vehicle films were irradiated in air with a mercury arc lamp and the volatile products were identified by infrared spectroscopy. The films included alkyd, oil, vinyl-alkyd, vinyl, vinyl acetate, epoxy-amine, and epoxy-polyamide films. A number of new absorption peaks were obtained from the products and some of these were identified. The major product of all the films was carbon dioxide. (Author)

AD-458 510 **Field 11H**
CFSTI Price: HC$1.00
Coating and Chemical Lab., Aberdeen Proving Ground, Md.
STORAGE STABILITY OF BRAKE FLUIDS.
Final rept.,
by Charles B. Jordan. 23 Feb 65, 10p CCL-176
Proj. DA-1C024401A108

Descriptors: (*Hydraulic fluids, Stability), Hydraulic brakes, Storage, Degradation, Containers, Glass, Steel, Military requirements, Corrosion inhibition, Additives.

The object of this study was to investigate the stability of corrosion inhibiting systems found in brake fluids approved under Federal Specification VV-H-910a after extended storage of the fluids in steel and glass containers. Corrosion and oxidation stability tests outlined in VV-H-910a were conducted on twenty-two approved fluids after 2 1/2 years storage in 5-gallon steel containers and on eight approved fluids after 5 years storage in 1-gallon glass containers. In all tests conducted there was evidence of inhibitor instability or depletion. Sixteen of the twenty-two fluids stored in cans and five of the eight fluids stored in glass failed to meet minimum requirements of specification VV-H-910a. Nine of the fluids stored in cans and three of the fluids stored in glass also fail the more relaxed requirements of Society of Automotive Engineers Specification, 70R1, which is the controlling specification of the Federal Register. (Author)

AD-459 403 **Field 11F, 13K**
CFSTI Prices: HC$2.00
Battelle Memorial Inst., Columbus, Ohio.
STEELS FOR PIPING SYSTEMS WITH MAXIMUM PRESSURES OF 10,000 PSI, AND OPERATING BETWEEN-150 F AND +150 F,
by H. W. Mishler. 2 Nov 64, 44p
Contract DA-01-021-AMC-203 (Z)
RSIC 327

Descriptors: (*Steel, Pipes), (*Pipes, Steel), High-pressure research, Welds, Mechanical properties, Nickel alloys, Impact shock, Fracture (Mechanics), Heat treatment, Gases, Helium, Hydrogen, Nitrogen, Low-temperature research, Guided missile launchers.

Identifiers: Steel 9 Ni, Steel HY-80.

This report presents the results of a survey that was made to find commercially available steels applicable for use in welded high-pressure piping systems. The highpressure piping systems operate at internal pressures of 3,500 to 10,000 psi and temperatures from-150F to +150F. The steel must be capable of being welded with little or no preheat and should be satisfactory for service without a postwelding stress-relief treatment. Two steels, low-carbon 9-percent nickel and HY-80, will meet the requirements for this application. The low-carbon 9percent-nickel steel can be welded with no preheat. Weld joints in the aswelded condition have excellent lowtemperature impact properties, good ductility, tensile strength of approximately 95,000 psi, and yield strength of approximately 60,000 psi. HY-80 steel is welded with a 200F maximum preheat, and it is possible to weld joints that have tensile strength of 130,000 psi and yield strength of 110,000 psi, good ductility, and good low-temperature impact strengths. Thick-walled seamless pipe made from the low-carbon 9-percentnickel-steel pipe is commercially available. HY-80 seamless pipe must be ordered specially. (Author)

AD-459 511 **Field 11B, 20B, 20C**
CFSTI Price: HC$4.00
Massachusetts Inst. of Tech., Cambridge. Lab. for Insulation Research.
STUDIES ON THE FORMATION AND PROPERTIES OF HIGH-TEMPERATURE DIELECTRICS.
Final rept.,
by A. von Hippel. Jul 64, 106p TR-191
Contract AF33 (616)-8353,
Proj. AF-7371,
Task 737101
ML TDR-64-219

Descriptors: (*Heat-resistant materials, Dielectrics), (*Dielectrics, Physical properties), Oxides, Carbides, Nitrides, Titanates, Rutile, Sulfides, Halides, Ferroelectric materials, Titanium compounds, Synthesis (Chemistry), Cadmium compounds, Barium compounds, Alkali metal compounds, Yttrium compounds, Bismuth compounds, Crystal growth, Films, Mass spectroscopy, Instrumentation, Electrical conductance, Chemical analysis, Crystal structure, Mossbauer effect, Garnet, Ruby, Borates, Aluminum compound, Silicates, Germanium compounds.

The report summarizes the outcome of a three year's project concerned with fundamental research, preparation methods, measurement techniques, and quantitative data on 'High-Temperature Dielectrics.' After theoretical discussion of basic problems, the survey presents a sequence: methods of growing high-temperature oxide crystals; film studies in ultrahigh vacua; development of a quadrupole mass spectrograph; dielectric instrumentation and measurements from low frequencies to millimeter waves and from low temperatures to beyond 1400C; research on ferroelectrics and on the band structure of TiC, TiN, and TiO; conduction phenomena in rutile; field gradient measurements on dielectrics; structure analysis of new high-temperature materials; chemical analysis and synthesis procedures; Mossbauer effect and breakdown strength investigations. (Author)

AD-460 142 **Field 11C, 7E**
CFSTI Price: HC$1.00
Naval Civil Engineering Lab., Port Hueneme, Calif.
DEGRADATION OF ORGANIC COATINGS BY IRRADIATION WITH LIGHT. II. ATTENUATED TOTAL REFLECTANCE SPECTRA OF COATINGS EXPOSED TO ULTRAVIOLET LIGHT,
by Peter J. Hearst. 26 Feb 65, 22p Technical note N-694
Proj. Y-R011-01-01-021
See also AD-458 231.

Descriptors: (*Organic coatings, Photolysis), (*Plastic coatings, Photolysis), (*Infrared spectroscopy, Organic coatings), Films, Ultraviolet radiation, Reflection, Polyester plastics, Vinyl plastics, Epoxy plastics, Amino plastics, Polyamide plastics, Degradation, Pigments, Test methods.

Clear and pigmented films of various vehicles were irradiated in air with a mercury arc lamp and attenuated total reflectance spectra were obtained before and after irradiation. The films included alkyd, vinyl-alkyd, vinyl, epoxy-amine, and epoxy-polyamide vehicles. Most of the major peaks in the ATR spectra decreased on irradiation, but some were unaffected and some peaks increased in intensity. The changes in the spectra of pigmented films were usually similar but less pronounced. This work is part of a study to discover better accelerated test methods for coatings. (Author)

AD-465 898 **Field 11L**
CFSTI Prices: HC$1.00 MF$0.50
Forest Products Lab., Madison, Wis.
FREE-CLOSE MOLDING VERSUS MOLDING TO STOPS IN WOOD-RESIN BLEND PROCESSING.
Research note,
by C. J. Gatchell and B. G. Heebink. Jun 65, 17p FPL-0103

Descriptors: (*Wood, Molding), (*Molding, Wood), Phenolic plastics, Compressive properties, Particle size, Particles, Stresses, Absorption (Physical), Density, Bonding, Geometric forms, Stability, Processing.

The influence of the manner and degree of compression on some physical and mechanical properties of molded wood-resin blends was studied. Yellow birch (Betula alleghaniensis) and Douglas-fir (Pseudotsuga menziesii var. menziesii) particles, processed from .015inch by 1-inch flakes, were used. The properties evaluated were modulus of rupture, modulus of elasticity, dimensional stability, water absorption, and flow. Flow was considered to be the ability of a blend to move in directions at right angles to an applied force. A method for evaluating such flow is described. Toward the upper limit of the compressive range, the degree of compression is more important than the manner (rate) of compression. Along with resin content, the degree of compression controls the formation of glue bonds which, in turn, control the properties of the molded product. The primary importance of species and particle size is in the influence of these variables on effective mat compression. (Author)

AD-466 266 **Field 11G**
CFSTI Prices: HC$1.00
Texas Transportation Inst., Texas A and M Univ., College Station.
SUGGESTIONS FOR PHASE II OF RESEARCH ON THE ELASTIC PROPERTIES OF ASPHALTIC CONCRETE. ELASTIC PROPERTIES OF ASPHALTIC CONCRETE,
by Bob M. Gallaway and R. A. Jimenez. May 65, 13p
Contract NBy-32281,
Proj. TAMRF-389

Descriptors: (*Asphalt, Elasticity), (*Pavements, Asphalts), Visioelasticity, Loading (Mechanics), Stresses, Strain (Mechanics).

A linear relationship does not exist between stress and strain for asphaltic concrete. Therefore, the modulus of elasticity and Poisson's ratio that may be cited must be referenced to a particular condition of strain. A knowledge of the elastic properties of the individual components of asphaltic concrete must be obtained before the probable deformation characteristics of a composite blend of these materials can be obtained. (Author)

AD-466 449 **Field 11G**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
GASES USED BY THE BUREAU OF NAVAL WEAPONS,
by E. R. Wright and A. M. Kershner. 23 Dec 64, 7p NAEC-AML-2106
Task RRMA-04-013/200-1/R001-02-01

Descriptors: (*Gases, Tables), Alkynes, Carbon dioxide, Chlorine, Halogenated hydrocarbons, Hydrogen, Nitrogen, Oxygen, Ammonia, Argon, Alkanes, Ethylene oxide, Helium, Sulfur compounds, Dioxides, Physical properties, Chemical properties.

The document is comprised of a series of charts listing the physical and chemical properties of 17 gases, including 9 halocarbons.

AD-466 461 **Field 11C**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
EVALUATION OF VARIOUS TOPCOATS AS GENERAL PURPOSE FINISHES FOR SUPERSONIC AIRCRAFT,
by A. O. Stander. 15 Feb 65, 15p NAEC-AML-2131
Task RRMA-05-010/200-1/R007-08-01

Descriptors: (*Aircraft finishes, Supersonic planes), Acceptability, Plastic paints, Epoxy plastics, Acrylic resins, Isocyanate plastics.

Specification MIL-C-22750 epoxy, AML-P-95K acrylic and experimental aliphatic and aromatic type polyurethane coatings were evaluated for potential use as general purpose finishes for high performance aircraft. An aliphatic polyurethane formulation, AML-P-43 MS was recommended for service testing. The AML-P-43 MS topcoat was found to withstand one-year exposure in Florida with no apparent chalking or loss in gloss. It was equal to or superior to the other topcoats in other film properties. (Author)

AD-466 462 **Field 11/C**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
THE EVALUATION OF SELF-POLISHING FINISHES FOR NAVAL WEAPONS SYSTEMS,
by W. E. MacKenzie. 9 Mar 65, 15p NAEC-AML-2156
Task RRMA-04-013/200-1/R001-02-01

Descriptors: (*Finishes + finishing, Weapon systems), (*Protective treatments, Weapon systems), Waxes, Polymers, Films, Moisture-proofing, Effectiveness, Naval equipment, Military requirements.

An investigation of self-polishing wax and/or polymer finishes is reported. Specification requirements for removable self-polishing finishes are included. (Author)

AD-466 521 **Field 11E**
CFSTI Prices: HC$2.00 MF$0.50
Watervliet Arsenal, N. Y. Benet Labs.
THREE DIMENSIONAL FORCE TRANSFER BETWEEN PARALLEL MICROFIBERS, RIGID OR ELASTIC.
Technical rept.,
by Michael A. Sadowsky and Moayyed A. Hussain.
Jun 65, 36p WVT-6520
Proj. DA-1-C-0-14501-B33A

Descriptors: (*Fibers, Elasticity), Microstructure, Stresses, Bonding, Complex variables, Force (Mechanics).

The problem of displacements and stresses in a matrix caused by relative displacements within a system of parallel rigid microfibers is solved by complex variable methods of elasticity theory. An application to a system of two microfibers is worked out. For elastic microfibers, the force transfer from fiber to fiber is shown to be an end effect. The length of the end segment actively engaged in force transfer has been estimated. (Author)

AD-466 679 **Field 11I, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Naval Ordnance Lab., White Oak, Md. Non-Metallic Materials Div.
THERMODYNAMIC PROPERTIES OF POLYVINYLIDENE CHLORIDE.
Final rept.,
by Robert W. Warfield and M. C. Petree. 23 Jun 65, 16p NOLTR-65-86
Proj. RRMA-03-071/212-1/R007-03-01

Descriptors: (*Polyvinyl chloride, Thermodynamics), (*Thermodynamics, Polyvinyl chloride), Lowtemperature research, Specific heat, Entropy, Enthalpy, Energy, Polymerization, Frequency, Vibration.

Using published specific heat data, the entropy, enthalpy and Gibbs free energy of polyvinylidene chloride (PVdC) have been calculated over the temperature range 0 to 200K. Using previously published data on the thermodynamic functions of vinylidene chloride, the entropy of polymerization at 200 K was found to be 21.17 cal/mole deg and the free energy of polymerization was -10.1 kcal/mole. The thermodynamic function Cp/T versus T for PVdC is approximately linear with zero slope over the temperature range 0 to 200K. The thermal motions of PVdC at low temperatures have been studied using the model of Stockmayer and Hecht. By means of this model the maximum frequency of vibration was found to be about 459/cm and the average molecular weight of the repeating unit to be 36.3 gms/mole. (Author)

AD-467 173 **Field 11H, 13I**
CFSTI Prices: HC$3.00 MF$0.75
Battelle Memorial Inst., Columbus, Ohio.
A STUDY OF THE INFLUENCE OF LUBRICANTS ON HIGH-SPEED ROLLING-CONTACT BEARING PERFORMANCE. PART V. RESEARCH ON ELASTOHYDRODYNAMIC LUBRICATION ON HIGH-SPEED ROLLING CONTACTS.
Final rept., Feb 64-Feb 65,
by Jerrold Kannel, J. Clarence Bell and J. A. Walowit. Jul 65, 97p
Contract AF33 (615)-1311,
Proj. AF-3044,
Task 304401
ASD TDR-61-643-Pt-5

Descriptors: (*Antifriction bearings, Lubrication), (*Lubricants, Antifriction bearings), Performance (Engineering), Loading (Mechanics), Deformation, Esters, Silicone plastics, Mineral oils, Hydrodynamics, Films, Pressure, Viscosity, Heat transfer, Disks, Rheology.

The effects of lubricants on the performance of heavily loaded rolling-contact elements were studied experimentally and theoretically. Measurements of the deformations of lubricated rolling elements were made using an X-ray technique for a range of loadings, temperatures, rolling speeds, and lubricants. A qualitative agreement appears to exist between variations in deformation profiles with lubricant types and variations in existing fatigue life with lubricant type. Efforts were made to infer film pressures from the deformation measurements. Film pressures were measured between steel as well as quartz disks using a manganin pressure transducer. For the heavily loaded conditions, a slight pressure spike appears in the measurements of pressures between steel disks. Stresses in the rolling elements were inferred from the pressure measurements. The magnitudes of the maximum stresses do not deviate significantly from the Hertzian stresses although the location of the maximum shearing stress is much closer to the surface. The temperature on the surface of a pair of quartz disks was measured using an evaporated resistance thermometer type transducer. (Author)

AD-468 289 **Field 11K**
CFSTI Prices: HC$1.00 MF$0.50
Coating and Chemical Lab., Aberdeen Proving Ground, Md.
DIMENSIONAL ANALYSIS OF TWENTY EIGHT DETERGENCY SYSTEMS.
Final rept.,
by A. Mankowich. 14 Jul 65, 23p CCL-181
Proj. DA-1C024401A329
N65 33 404

Descriptors: (*Cleaning compounds, Analysis), (*Surface-active substances, Analysis), Solutions, Surface tension, Dipole moments, Phenols, Sulfonates, Sulfates, Ethers, Fatty acids.

Identifiers: Micelles, Dimensional analysis.

Replacement of micellar solubilization by surfactant concentration as one of the six significant variables of the detergency process resulted in a more useful set of dimensionless products. The change affords easier and more accurate experimental control over the products, and an improved detergency diagram. The latter, representing a log-log function of two of the dimensionless products at parameter values of the third, consists of a series of parallel lines with a negative slope of approximately 45C. The dimensional analysis was validated by twenty-five foil-surfactant systems formed from six different types of soil and seven surfactants including two types of anionics and two types of nonionics. (Author)

BDX-613-12 **Field 11I, 11A**
CFSTI Prices: HC$1.00 MF$0.50
Bendix Corp., Kansas City, Mo.
SURFACE PREPARATION OF PLASTICS FOR ADHESIVE BONDING,
by Lloyd C. Jackson. Nov 60, 7p
Contract AT (29-1)-613
Presented to Adhesive Age Magazine.

Descriptors: (*Plastics, Surface area), (*Bonding, Plastics).

BDX-613-73 **Field 11F, 13E**
CFSTI Prices: HC$2.00 MF$0.50
Bendix Corp., Kansas City, Mo.
SOLDERABILITY TESTING,
by William B. Harding. Jul 65, 40p CONF-650702-2
Contract AT (29-1)-613
Presented at American Electroplaters Convention, New York.

Descriptors: (*Metal joints, Soldering), (*Soldered joints, Test methods).

BNWL-141 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
A STUDY OF TUNGSTEN-TECHNETIUM ALLOYS.
Quarterly progress rept., 1 Jan-1 Apr 65.
Sep 65, 9p
Contract AT (45-1)-1830

Descriptors: (*Tungsten alloys, Recovery), (*Technetium alloys, Recovery).

BNWL-142 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
A STUDY OF TUNGSTEN-TECHNETIUM ALLOYS.
Quarterly progress rept., 1 Apr-1 Jul 65.
Sep 65, 18p
Contract AT (45-1)-1830

Descriptors: (*Tungsten alloys, Microstructure), (*Technetium alloys, Microstructure).

DPSPU-65-30-18 **Field 11F, 18I**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Plant.
METALLOGRAPHIC EXAMINATION OF HIGHLY ALPHACONTAMINATING MATERIALS,
by G. A. Mccaskey. Mar 65, 14p CONF-650414-1
Contract AT (07-2)-1
Prepared for presentation at Metallographic Group Meeting (19th), Oak Ridge, Tenn.

Descriptors: (*Contamination, Containment), (*Metallography, Contamination).

EURAEC-1179 **Field 11F, 18J**
CFSTI Prices: HC$4.00 MF$0.75
Commissariat a l'Energie Atomique, Aclay (France). Centre d'Etudes Nucleaires.
URANIUM MONOCARBIDE SHAPING AND IRRADIATION STUDY.
Final rept. no. 2, 1 Mar 62-31 Dec 63,
by J. P. Dumas, B. Mansard, and P. Rousset.
1965, 110p
Contract 080-62-3-RDF

Descriptors: (*Reactor fuels, Uranium compounds), (*Uranium compounds, Carbides).

EURAEC-1192 **Field 11F, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Institut de Recherches de la Siderurgie, St.-GermainenLaye (France).

STUDY OF BASE METAL TO BE USED IN RESEARCH ON BRITTLE FRACTURE OF LARGE WELDED ASSEMBLIES.
Quarterly rept. no. 1, 1 May-30 Jul 64.
Aug 64, 6p
Contract 031-64-5-GEEF (RD)

Descriptors: (*Steel, Brittleness), (*Fracture (Mechanics), Steel).

EURAEC-1209 **Field 11F, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Institut de Recherches de la Siderurgie, St.-GermainenLaye (France).
STUDY OF BASE METAL TO BE USED IN RESEARCH ON BRITTLE FRACTURE OF LARGE WELDED ASSEMBLIES.
Quarterly rept. no. 2.
Oct 64, 5p
Contract 031-64-5-GEEF (RD)

Descriptors: (*Steel, Brittleness), (*Fracture (Mechanics), Steel).

EURAEC-1225 (Pt. 1) **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Brussels Univ. (Belgium).
A STUDY OF SOME METAL OXIDATION PROBLEMS AND APPLICATION OF IMPEDANCE MEASUREMENT METHODS TO THE STUDY OF RESISTANCE TO CORROSION IN AN AQUEOUS MEDIUM.
Quarterly rept no. 10, 1 Jul-30 Sep 64,
30 Sep 64, 13p
Contract 012-63-10
Proj. 289

Descriptors: (*Oxidation, Metals), (*Corrosion inhibition, Metals).

EURAEC-1270 **Field 11F**
CFSTI Prices: HC$5.00 MF$1.00
Compagnie Pechiney, Paris (France).
ZIRCONIUM ALLOYS.
Final rept. no. 1, 1 Apr 62-31 Mar 64,
by R. Syre, A. Guilhaudis, J. Orsag, J. Bonmarin, andR. Bourbon. Jul 64, 153p
Contract 067-62-4

Descriptors: (*Zirconium alloys, Mechanical properties), (*Corrosion, Zirconium alloys).

EURAEC 1173 **Field 11F, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Commissariat a l'Energie Atomique, Aclay (France). Centre d'Etudes Nucleaires.
STUDY OF THE SHAPING AND IRRADIATION OF URANIUM MONOCARBIDE.
Quarterly rept no. 14, 1 Apr-30 Jun 64,
by J. P. Dumas and B. Mansard. 30 Jun 64, 42p
Contract 080-62-3/RDF,
Proj. 209

Descriptors: (*Reactor fuels, Uranium compounds), (*Uranium compounds, Carbides).

GA-6454 **Field 11F, 18J**
CFSTI Prices: HC$1.00 MF$0.50
General Atomic, San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
A RESEARCH PROGRAM ON THE EFFECT OF SUBSTRUCTURE ON THE IRRADIATION STABILITY OF ASTM A302 GRADE B STEEL.
Quarterly progress rept no.,1,
by T. A. Trozera and P. W. Flynn. 2 Jun 65, 12p
EURAEC-1410
Contract AT (04-3)-167

Descriptors: (*Steel, Radiation damage), (*Mechanical properties, Steel).

GEMP-362 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
EVALUATION OF CHROMIUM-RUTHENIUM ALLOYS,
by C. S. Wukusick. 25 Jun 65, 23p
Contract AT (40-1)-2847

Descriptors: (*Chromium alloys, Ductility), (*Ruthenium alloys, Ductility).

HW-84550 **Field 11F, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
A STUDY OF TUNGSTEN - TECHNETIUM ALLOYS.
Quarterly progress rept., Oct 1 64 - Jan 1, 65.
1 Jan 65, 28p
Contract AT (45-1)-1350

Descriptors: (*Tungsten alloys, Technetium), (*Fission products, Technetium).

IS-T-13 **Field 11F, 20C**
CFSTI Prices: HC$2.00 MF$0.50
Ames Lab., Iowa State Univ. of Science and Tech.
THE ELECTRICAL RESISTIVITY OF THORIUM AND DILUTE THORIUM-GADOLINIUM ALLOYS (THESIS),
by David Fairfield Page. May 65, 38p
Contract W-7405-eng-82

Descriptors: (*Resistance (Electrical), Thorium alloys), (*Thorium alloys, Gadolinium alloys).

LA-DC-6580 **Field 11F, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
DENSITIES OF SOME LOW MELTING CERIUM ALLOYS,
by R. H. Perkins, L. A. Geoffrion, and J. C. Biery. 1962, 44p
Contract W-7405-eng-36

Descriptors: (*Cerium alloys, Density), (*Reactor fuels, Cerium alloys).

LA-3307 **Field 11F, 11B**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., N. Mex.
COMPATIBILITY OF REFRACTORY METALS WITH SOLID SOLUTION (UC) (ZRC) AT ELEVATED TEMPERATURES,
by K. V. Davidson, R. E. Riley, and J. M. Taub. Feb 65, 17p
Contract W-7405-eng-36

Descriptors: (*Refractory metals, Solid solutions), (*Solid solutions, Refractory metals).

N66-10666 **Field 11C**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
PERFORMANCE OF FIVE ABLATION MATERIALS AS COATINGS FOR STRUCTURES IN A REGION OF SEPARATED FLOW.
Technical note,
by Louis E. Clark and Allen G. McLain. Nov 65, 30p NASA-TN-D-3093

Descriptors: (*Ablation, Coatings), (*Coatings, Materials).

N66-11256 **Field 11C**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ANALYSIS OF SHEAR BOND STRENGTH OF PLASMASPRAYED ALUMINA COATINGS ON STAINLESS STEEL.
Technical note,
by Salvatore J. Grisaffe. Nov 65, 16p NASA-TN-D-3113

Descriptors: (*Stainless steel, Aluminum coatings), (*Aluminum coatings, Stainless steel).

NAA-SR-10929 **Field 11F, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
THE NATURE AND PROPERTIES OF THE CARBIDES OF URANIUM,
by O. O. Gamba. 31 Aug 65, 61p
Contract AT (11-1)-GEN-8

Descriptors: (*Reactor materials, Mechanical working), (*Uranium compounds, Carbides).

NMI-5025 **Field 11F, 18J**
CFSTI Prices: HC$2.25 MF$1.25
Nuclear Metals, Div. Textron, Inc., West Concord, Mass.
TECHNICAL PAPERS OF THE METALLOGRAPHIC GROUP MEETING (18th) HELD JUNE 22-24, 1964, ATOMIC INTERNATIONAL, CANOGA, PARK, CALIFORNIA,
by H. Roth Roman. Aug 65, 212p CONF-607 Pt. 1
Contract AT (40-1)-2847

Descriptors: (*Reactor materials, Metallography), (*Metallography, Reactor materials).

NMI-7075 **Field 11F, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Nuclear Metals, West Concord, Mass.
METALLURGICAL INVESTIGATION OF U-350 SI-1000 MO ALLOY,
by A. M. White. 10 May 65, 26p
Contract AT (30-1)-1565

Descriptors: (*Uranium alloys, Hardness), (*Silicon alloys, Molybdenum alloys).

NYO-2784-9 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Nuclear Metals, West Concord, Mass.
FUNDAMENTAL AND APPLIED RESEARCH AND DEVELOPMENT IN METALLURGY.
Progress rept. 11 Mar 65,
20 May 65, 29p NMI-2138
Contract AT (30-1)-2784

Descriptors: (*Tungsten alloys, Extrusion), (*Rhenium alloys, Extrusion).

ORNL-3862 **Field 11F, 20B**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
THE ENERGY OF FORMATION OF A DOUBLE KINK AND AN EXAMINATION OF LOW-TEMPERATURE DEFORMATION,
by R. J. Arsenault. Sep 65, 29p
Contract W-7405-eng-26

Descriptors: (*Crystal lattice defects, Low-temperature research), (*Metallic crystals, Deformation).

Patent 3,222,203 **Field 11I**
N-ACYL DERIVATIVES OF CYCLIC IMINES.
Patent assigned to Agriculture,
by Evald L. Skau, Robert R. Mod and Frank C. Magne. 7 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Plasticizers, Preparation), (*Imines, Plasticizers), (*Piperidines, Plasticizers), Polyvinyl chloride, Additives, Compatibility, Fatty acids, Patents.

The products are solvent-type plasticizers for vinyl chloride resins. Products include N-2-ethylhexanoylpiperidine, N-napthenoylpiperidine and Nricinoleoylpiperidine.

PB-168 754 **Field 11F**
CFSTI Prices: HC$7.00 MF$1.50
Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
INTERMETALLIC COMPOUNDS; A REPORT BIBLIOGRAPHY.
Dec 65, 311p

Descriptors: (*Intermetallic compounds, Bibliographies), (*Bibliographies, Intermetallic compounds), Semiconductors, Semiconductor devices, Thermoelectricity, Alloys, Physical properties, Solid state physics, Thermodynamics, Power equipment.

PB-168 933 **Field 11F, 20B**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
STRUCTURES A LONGUES PERIODES DAN LES ALLIAGES OR-CUIVRE (Long-Period Structures in Gold-Copper Alloys).
Doctoral thesis in French,
by Jehanno Germain. 1965, 75p CEA-R-2812
Text in French, Attached Summary in English.

Descriptors: (*Gold alloys, Copper alloys), (*Phase studies, Gold alloys), X-ray diffraction analysis, Crystal structure, Metallic crystals, Grain structure (Metallurgy), Annealing, France.

The gold-copper equilibrium diagram is reevaluated for alloys between Au20Cu80 and Au65Cu35. The identification of the various phases was performed by X-rays diffraction on quenched polycristalline samples. The structure is studied of the phase AuCuII. X-ray data collected from bulk single crystals show that this longperiod structure must be described with the help of two correlated periodic functions: an 'order function' and a 'displacement function'. The 'order function' conciliates the non-integer value of the period with its rigorous definition. The 'displacement function' accounts for the dissymetries of the observed intensities for the antiphase homologous reflections as the appearance of satellites arounds the fundamental reflections. These two functions are remarkably well defined at long distance in carefully annealed samples and, in some conditions, can be obtained independently. (Author)

PB-169 048 **Field 11F**
CFSTI Prices: HC$3.00 MF$0.75
Armour Research Foundation, Chicago, Ill.
CASTING OF TITANIUM AND TITANIUM BASE ALLOYS.
Final rept.
18 Feb 53, 89p
Contract NObs-54299,
Proj. ARF-90-1033-B
AD 61 990

Descriptors: (*Titanium, Casting), Titanium alloys, Molding, Furnaces, Processing, Molding materials, Ductility, Hardness, Machining, Heat treatment.

The objective of this project is the development of techniques for producing titanium and titanium alloy castings. A furnace was developed which permits the convenient melting and casting of titanium in an argon atmosphere. Mechanical operation has been simplified and standardized so that a minimum of supervisory effort and maintenance is required. Various mold materials were evaluated for the casting of titanium. A sand mix, coated with colloidal graphite, was found which resists chemical reaction with titanium cast in thin sections, and also exhibits a minimum of spalling, erosion, and sand burning. Several castings of industrial significance were successfully made. These include gate-valve bodies and discs, gate-valve seating rings, and wear rings for centrifugal pumps. Melting and casting techniques were evolved, whereby it is possible to produce alloy castings with hardnesses as low as 280 VHN, and as high as 330 VHN which have proved to be machinable. The tensile strength of the metal in the as-cast condition was about 90 to 100,000 Psi, although ductility was quite poor - not much over 0%. However, experimental heat treatments applied to several alloys increased the ductility to as much as 6.7%. A major source of difficulty in producing sound castings was the entrapment of the mold atmosphere (mostly argon) by the incoming metal. This caused formation of gas pockets within the casting during solidification. The amount of mold atmosphere entrapped was reduced by various gating, venting, and purging techniques. (Author)

PB-169 070 **Field 11F, 20M**
CFSTI Prices: HC$2.00 MF$0.50
California Univ., Berkeley.
SPECIFIC HEATS OF THE CHROMIUM-NICKEL SYSTEM.
Master's thesis,
by Cletis C. Land. 1957, 27p
Grant NSF G1903

Descriptors: (*Chromium alloys, Nickel alloys), (*Nickel alloys, Chromium alloys), (*Specific heat, Nickel alloys), Experimental data, Tables, Graphics, Equations of state, Enthalpy.

Heat contents were determined in a liquid diphenyl ether calorimeter for four Cr-Ni alloys containing 1-11 atomic percent chromium. The results from this investigation seem to prove conclusively that the data determined by A. W. Foster are in error. Foster found a twenty percent negative deviation from the Kopp-Neumann Rule for the two percent alloy while the present investigation shows only a small deviation. From the measured heat content data, graphs have been plotted to determine C sub p, H sub T -H sub st, and S sub T -S sub st for the four alloys. This data has been tabulated for temperatures of 400K-800K. (Author)

PB-169 087 **Field 11F, 20M**
CFSTI Prices: HC$1.00 MF$0.50
California Univ., Berkeley.
THE HEAT CAPACITY OF SOLID SOLUTIONS OF CADMIUM IN SILVER,
by Ralph Hultgren and K. N. Rao. 1956, 6p
Grant NSF-G1903

Descriptors: (*Cadmium alloys, Silver alloys), (*Silver alloys, Cadmium alloys), (*Solid solutions, Thermodynamics), Solid solutions, Measurement, Thermal properties, Enthalpy.

Heat contents above 298.15K were determined to 600K for both alloys and the metals from which they were prepared. Duplicate determinations were made; in no case did a determination vary more than ten calories from the tabulated value. However, the forty-two percent cadmium alloy at 500K gave erratic, generally high, results. This was interpreted as meaning that the solubility limit was overstepped at 600K, so the results were discarded. The heat contents are additive within experimental error. This indicates that both alloys obey the Kopp-Neumann rule of the additivity of heat capacities within this temperature range. No effect of electron concentration on the heat capacity was detected. If such an effect exists, it can amount to no more than a few hundredths of a calorie per gram atom. (Author)

RFP-543 **Field 11F, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Div., Golden, Colo.
A SPECIAL METALLOGRAPHIC TECHNIQUE FOR PLUTONIUM-ELECTROLYTIC SWAB ETCHING,
by R. L. Grecson, W. L. Johns, and R. J. Jackson.
1 Oct 65, 14p
Contract AT (29-1)-1108

Descriptors: (*Etching, Plutonium), (*Metallography, Reactor fuel elements).

RFP-623 **Field 11F, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
HOT EXTRUSION OF FINE PLUTONIUM WIRE,
by B. J. Bear and R. B. Fischer. 27 Sep 65, 8p
Contract AT (29-1)-1196

Descriptors: (*Extrusion, Plutonium), (*Plutonium, Wire).

SC-DR-65-519 **Field 11F, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
ION PLATED COATINGS FOR THE CORROSION PROTECTION OF URANIUM,
by R. D. Bland, J. E. McDonald, and D. M. Mattox.
Oct 65, 26p
Contract AT (29-1)-789

Descriptors: (*Uranium, Protective treatments), (*Metal coatings, Corrosion inhibition).

SRIA-132 **Field 11F, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
HIGH TEMPERATURE OXIDATION AND NITRIDATION OF NIOBIUM IN ULTRAHIGH VACUUM.
Final rept. for 1 Jul 63-31 Oct 64,
by R. A. Pasternak. 15 Nov 64, 64p
Contract AT (04-3)-115

Descriptors: (*Niobium, Oxidation), (*Nitrogen, Niobium).

UCRL-14215 **Field 11F, 20B**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
INFLUENCE OF IRON ON OXYGEN GRAIN-BOUNDARY DIFFUSION IN PERICLASE CRYSTALS.
Master's thesis,
by D. R. McKenzie. 1 Sep 65, 25p
Contract W-7405-eng-48

Descriptors: (*Grain structures (Metallurgy), Metallic crystals), (*Diffusion, Crystals).

UCRL-16024 **Field 11F, 20B**
CFSTI Prices: HC$3.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Berkeley.
ANALYSIS OF DISLOCATION LOOPS IN QUENCHED FCC METALS.
Master's thesis,
by Walter Lee Bell. Jun 65, 75p
Contract W-7405-eng-48

Descriptors: (*Crystal lattice defects, Metallic crystals), (*Metallic crystals, Strain (Mechanics).

12. MATHEMATICAL SCIENCES

AD-466 685 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.75
Washington Univ., Seattle. Lab. of Statistical Research.
SPACINGS,
by Ronald Pyke. 8 Jul 65, 84p Technical rept. TR-42
Contract Nonr-477 (38),
Proj. NR-042-038
Prepared in cooperation with Cambridge Univ. (England).

Descriptors: (*Distribution theory, Probability), Statistical tests, Aviation accidents, Theorems.

The distribution theory and possible constructions for spacings (differences) between successive order statistics of a sample of independent and identically distributed random variables is reviewed. The problem of finding the limiting distribution of a function of spacings is discussed and some general limit theorems for such are presented.

AD-467 504 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.75
Polytechnic Inst. of Brooklyn, N. Y. Microwave Research Inst.
STOCHASTIC TIME-OPTIMAL CONTROL.
Scientific rept.,
by Prentiss N. Robinson. Jun 65, 59p PIBMRI-1268-65
Contract AF49 (638)-1402
AFOSR 65-1718,
N65 31 942

Descriptors: (*Stochastic processes, Control systems), (*Control systems, Stochastic processes), Dynamic programming, Optimization, Statistical processes, Iterative methods, Time, Partial differential equations.

The problem under study is the stochastic timeoptimal control problem. Basically the object is to determine a control input which causes the output of a stochastic system to reach some region R of the origin in such a way that the expected value of the time required to reach R is minimized. The system is assumed to satisfy a stochastic differential equation. This problem has already been considered by a few authors, however in most cases serious errors were made in their analysis and problem statement. In this study a careful problem statement is made, appropriate optimization equations derived, and an iterative method of solution technique (approximation in policy space) is applied to solve certain specific problems. (Author)

LADC-6451 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
ON THE DISCRETIZATION ERROR OF THE NUMERICAL SOLUTION OF THE THIRD BOUNDARY VALUE PROBLEM,
by Neil M. Wigley. 17p
Contract W-7405-eng-36

Descriptors: (*Boundary value problems, Numerical methods and procedures), (*Approximation (Mathematics), Boundary value problems).

LADC-6484 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
COMPARISONS OF SOME TWO-STAGE SAMPLING METHODS,
by Aeron S. Goldman. 1963, 11p
Contract W-7405-eng-36

Descriptors: (*Sampling, Probability).

N65-34238 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Martin Co., Denver, Colo.
CONTACT TRANSFORMATIONS AND THE THEORY OF OPTIMAL CONTROL,
by R. S. DeZur and G. W. Haynes. Sep 65, 29p
Contract NAS2-2351
NASA CR-306

Descriptors: (*Control systems, Optimization), (*Transformations (Mathematics), Control).

N65-34432 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Martin Co., Denver, Colo.
ON THE OPTIMALITY OF A TOTALLY SINGULAR VECTOR CONTROL: AN EXTENSION OF THE GREEN'S THEOREM APPROACH TO HIGHER DIMENSIONS,
by George W. Haynes. Sep 65, 29p
Contract NAS2-2351
NASA CR-305

Descriptors: (*Control systems, Optimization).

PB-168 967 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Chicago Univ., Ill. Dept. of Mathematics.
ALGEBRAIC LOGIC AND SET THEORY; ENTROPY AND ERGODIC THEORY.
Final rept.,
by P. R. Halmos. Aug 61, 46p
Grants NSF-G2266, NSF-G5872

Descriptors: (*Algebra, Mathematical logic), (*Set theory, Algebra), (*Measure theory, Entropy), Matrix algebra, Operators (Mathematics), Algebras.

Contents: Roots of normal operators; Roots of Banach algebras; Representations of some special Banach algebras; States and representations; Dirichlet algebras and the shift operator; Structure theorem for w* algebras; Algebras on an arc; Kurega's problem; Semi-Carleman operators; Semi-similarity; Solution of the equation AX = XB; Dilation of positive operators; Entropy of measurements; Resolvants of finitedimensional matrices; Inequalities for formally positive integro-differential forms.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

AD-446 247 **Field 13E, 1C**
CFSTI Price: HC$2.00
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
THE EFFECT OF NUT DESIGN ON THE FATIGUE LIFE OF INTERNAL WRENCHING BOLTS,
by Joseph Viglione. 17 Jun 64, 47p NAEC-AML-1910
Tasks RAE-30C-004/200-1/F012-07-02, 2

Descriptors: (*Bolts, Fatigue (Mechanics)), (*Locking fastener devices, Design), Performance (Engineering), Aircraft.

This evaluation demonstrated the wide range of fatigue life that may be obtained with internal wrenching bolts, depending upon the use of different type nuts. The effects of individual design factors such as height of nut, strength of nut, use of lubricants, angularity, tightening torque, etc., were quantitatively determined. Recommendations are made concerning the development and evaluation of specifications for nuts and bolts, and their use in military aircraft design and construction. (Author)

AD-448 884 **Field 13H**
CFSTI Price: HC$1.00
Frankford Arsenal, Philadelphia, Pa. Research and Development Directorate.
EXPLOSIVE WELDING,
by H. J. Addison, Jr. May 64, 18p
Proj. DA-1-A-0-24401-A-110
FA A64-13,
N65 10656
American Society of Mechanical Engineers paper no. 64-MD-47.

Descriptors: (*Welding, Explosive forming), (*Explosive forming, Welding), Welds, Tensile properties.

Explosive welding occurs when adjacent surfaces of appropriately positioned metals are properly thrust together by energy released from an explosive source. The procedure consists essentially of locating the metal members being welded between an explosive charge and an anvil with the lower member resting on the anvil. Explosive welding can be used for spot and seam welding and cladding. Lap, tee, and edge joints (such as is experienced in cladding) have been fabricated. Corner and butt joints are feasible. Tensileshear strengths approaching that of the base metal have been obtained in various materials in seamwelded lap joints. Explosive spot welds have failed outside the nugget. Explosive welding is feasible and offers possibilities as a future fabrication method.

AD-456 647 **Field 13H**
CFSTI Price: HC$3.00
Battelle Memorial Inst., Columbus, Ohio.
FLUIDIZED-BED COATING WITH ORGANIC AND INORGANIC MATERIALS,
by W. M. Goldberger. 1 Jul 64, 62p
Contract DA-01-021-AMC-203 (Z)
RSIC 238

Descriptors: (*Fluidized bed processes, State-of-theart reviews), Protective treatments, Coatings, Plastic coatings, Organic coatings, Inorganic compounds, Ceramic coatings, Refractory coatings, Bibliographies, Metal coatings, Manufacturing methods, Material forming, Silicides, Preparation, Test methods, Fluid flow.

The report reviews the present technology of fluidizedbed coating processes. The first part deals with the coating of bulk substrates with organic polymers. The second part describes the use of the fluidized-bed method for obtaining inorganic coatings on metal surfaces, the principles of fluidization are discussed in relation to both types of coating. The review includes a discussion of performance factors, current applications, cost factors, and the advantages and limitations of fluidized-bed coating processes. A bibliography is presented comprising 44 references to the recent literature on organic coating and 21 annotated references to coating with inorganics.

AD-465 797 **Field 13A, 14B**
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
THE NOL 3MW 3-PHASE A-C ARC HEATER (MARK II).
Final rept.,
by R. E. Lee and R. L. Humphrey. 22 Apr 65, 33p NOLTR-63-222, Aerodynamics-RR-210

Descriptors: (*Hypersonic wind tunnels, Heaters), (*Heaters, Electric arcs), Design, Performance (Engineering), Electrodes, Magnetic fields, Water, Cooling, Operation.

An a-c arc heater developed for the NOL 3 MW research arc is described. This heater has three doughnut-shaped electrodes with internal coils to increase the magnetic field strength. The operation and performance of this design are discussed. Temperatures from 3500 to 4000K with efficiencies from 15 to 23 percent were obtained at pressures from 10 to 15 atmospheres. Multiple arc streamers and the diffusion of the arc into the center of the chamber were observed. A high level of contamination of the effluent gas, an unsatisfactory magnetic design, and short component life make the design unsatisfactory. Methods of eliminating these problems are discussed. (Author)

AD-465 899 **Field 13E**
CFSTI Prices: HC$1.00 MF$0.50
Forest Products Lab., Madison, Wis.
PERFORMANCE OF CONTAINER FASTENERS SUBJECTED TO STATIC AND DYNAMIC WITHDRAWAL,
by R. S. Kurtenacker. Jun 65, 22p FPL-29

Descriptors: (*Fastenings, Containers), Wood, Performance (Engineering), Loading (Mechanics), Impact shock, Shock resistance, Load distribution, Storage, Tests, Statistical analysis.

The performance of 15 different types of metal fasteners was studied in simulated container applications. The specimens were assembled at 20 percent moisture content and subjected to indoor storage under controlled conditions of temperature and relative humidity, and to outdoor storage. Impact and static withdrawal forces were applied after various periods of storage. The instrumentation used to measure maximum loads and time duration of impacts is fully described. Analyses of variance are used to evaluate the data. Helically threaded nails and nyloncoated staples retained their initial resistance to withdrawal after a year of storage at 73F. and 50 percent relative humidity, while other fasteners exhibited a marked decrease in withdrawal resistance 2 weeks after driving. Helically threaded nails exhibited the best performance after 1 year on an outdoor exposure fence. Some fastener coatings offered resistance to corrosion but did not improve resistance to withdrawal. In general, dynamic withdrawal loads were significantly higher than corresponding static-withdrawal values. (Author)

AD-466 264 **Field 13B**
CFSTI Prices: HC$1.00 MF$0.50
Texas Transportation Inst., Texas A and M Univ., College Station.
ELASTICITY THEORY APPLIED TO FLEXIBLE PAVEMENT DESIGN,
by F. H. Scrivner. May 65, 25p
Contract NBy-32281,
Proj. TAMRF-389,
Task Y-F015-15-02-199

Descriptors: (*Pavements, Modulus of elasticity), Asphalt, Bituminous coatings, Concrete, Deformation, Stresses.

Current research work in the area of flexible pavements has shown that granular paving materials do not obey Hooke's law. New research should be directed towards developing a new law for the deformation of these granular materials. (Author)

AD-466 450 **Field 13D, 16D, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
APPLICATION OF TRANSPARENT CUSHIONING FOR THE PROTECTION OF POLARIS MODULES.
29 Jun 65, 7p NAEC-AML-2180

Descriptors: (*Modules (Electronic), Packaging), (*Packaging, Modules (Electronic)), Films, Plastics, Drop testing, Impact shock, Shock resistance, Guided missile components.

Identifiers: Polaris.

AD-467 339 **Field 13J, 20A**
CFSTI Prices: HC$1.00 MF$0.50
Navy Marine Engineering Lab., Annapolis, Md.
COMPARISON OF DYNAMIC SHEAR MODULUS MEASUREMENTS ON TWO DAMPING MATERIALS.
Research and development rept.,
by Walter Blasingame. Jul 65, 23p MEL-244/65
Proj. S-F013 11 08,
Task 1350

Descriptors: (*Ship noise, Acoustic insulation), (*Acoustic insulation, Shear stresses), Damping, Synthetic rubber, Polyvinyl chloride, Measurement, Optimization, Viscoelasticity, Vibration, Design.

In order to ascertain the current state-of-the-art for direct measurements of the dynamic shear modulus of damping materials to be used in controlling ship acoustic noise, four participants made measurements on two materials and their results were compared. This comparison showed large differences which were attributed mostly to measuring techniques or apparatus. Because it could not be definitely ascertained which results were in error and by what amount, a particular method is not recommended. Investigation of the use of indirect methods and new or modified direct methods is under way at MEL to achieve a reasonable solution to the measurement problem and permit optimum design of constrained damping configurations and material procurement. (Author)

AD-467 420 **Field 13M, 13B**
CFSTI Prices: HC$1.00 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
A BIBLIOGRAPHY ON WINTER CONSTRUCTION 1940-1963,
by Charles W. Fulwider. Jun 65, 50p Special rept. SR-83
Task DA-1V025001A13002

Descriptors: (*Cold weather tests, Civil engineering), (*Civil engineering, Polar regions), (*Construction, Polar regions), Materials, Earth-handling equipment, Structures, Bibliographies.

Contents: Bridge construction; Building construction; 'Cold' concrete; Concrete aggregates, heating; Concrete, protection; Concrete, theory and experiment; Concreting; Construction - general; Costs, Dam construction, Drilling; Earthwork and excavation techniques; Equipment operation and care; Excavating - blasting; Excavating tools and machinery; Excavation, trench; Frozen ground, thawing; Heating equipment; Masonry and brickwork; Railroad construction; Road and airfield runway construction.

AD-467 500 **Field 13J, 14B, 13A**
CFSTI Prices: HC$2.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
A PROPOSED SYSTEM FOR SUPPLYING AIR TO A HYPOTHETICAL UNDEROCEAN SEABEE BASE. II. THE VENTURI GAS EXCHANGER.
Interim rept. Jul 63-Jul 65,
by Harold P. Vind and Arthur Langguth. 16 Jun 65, 27p Technical note N-734
Proj. Y-R011-01-01-058

Descriptors: (*Laboratories, Underwater), (*Underwater equipment, Ventilation), (*Military facilities, Underwater), Shelters, Civil engineering, Gas pumps, Closed ecological systems, Feasibility studies, Controlled atmospheres, Confined environments, Navy research.

A device called a 'venturi gas exchanger' was designed and constructed. The function of the device is to continuously scrub the interior atmosphere of a simulated underwater chamber in sea water. The only source of oxygen in the experimental chamber is that removed from the sea water during the scrubbing process, and the only means for removing carbon dioxide from the chamber is the same scrubbing process. A micro-burner can be kept burning indefinitely in the chamber; and two rats were maintained in the chamber for an entire eight hour day. During their stay in the chamber, the rats appeared to be comfortable and they suffered no discernible ill effects from the experience. Future plans call for the construction of a submersible model of the venturi gas exchanger which will be employed to ventilate a submerged manned enclosure. (Author)

BMI-1746 **Field 13H, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
HOT ISOSTATIC COMPACTION OF GRAPHITE.
by Donald C. Carmichael, P. Darrell Ownby, and Edwin S. Hodge. 5 Oct 65, 37p

Descriptors: (*Compacting, Graphite), (*Graphite, Reactor materials).

HW-70938 (Del.) **Field 13H, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
AN ULTRASONIC WELDING PROCESS FOR ATTACHING ALUMINUM SUPPORT RAILS TO CYLINDRICAL ALUMINUM-CLAD HANFORD FUEL ELEMENTS,
by E. V. Padgett, Jr. 5 Sep 61, 32p
Contract AT (45-1)-1350

Descriptors: (*Welding, Ultrasonic radiation), (*Reactor fuel elements, Welding).

KAPL-3030 **Field 13G, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Knolls Atomic Power Lab., Schenectady, N. Y.
FLOPSY-II-A DIGITAL COMPUTER PROGRAM FOR CALCULATING FLOWS AND PRESSURE DROPS IN HYDRAULIC NETWORKS,
by B. L. Strain. 1 Jun 65, 46p
Contract W-31-109-eng-52

Descriptors: (*Hydraulic systems, Fluid flow), (*Fluid flow, Programming (Computers)).

KY-500 **Field 13D, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Paducah Gaseous Diffusion Plant, Ky.
TESTING OF TEN-TON URANIUM HEXAFLUORIDE CYLINDERS,
by W. R. Pedigo, V. A. Smith, and S. Bernstein. 22 Oct 65, 57p
Contract W-7405-eng-26

Descriptors: (*Containers, Test methods), (*Reactor fuels, Containment).

N66-10331 **Field 13G**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
OPTIMIZED TURNING-VANE DESIGN FOR AN INTAKE ELBOW OF AN AXIAL-FLOW COMPRESSOR.
Technical note,
by S. Z. Pinckney. Nov 65, 27p NASA-TN-D-3083

Descriptors: (*Axial-flow compressors, Compressor parts), (*Compressor parts, Design).

Patent 3,218,509 **Field 13A**
RADIANT ENERGY SOURCE.
Patent assigned to Air Force,
by George P. Ploetz. 16 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Carbon arc lamps, Design), (*Arc heaters, Design), Thermal radiation, Light, Gas discharges, Plasma medium, Electrodes, Patents.

Primary and secondary sources of thermal energy are provided and a thermal and light imager is interposed between them. The primary thermal source is comprised of a multiplicity of electrodes enclosed in a vacuum chamber having a window, perferably of quartz or other transparent but high temperature resistant material. The secondary thermal source may be a conventional carbon arc which when energized transfers thermal energy to the electrodes of the primary thermal source by way of the interposed thermal and light imager.

Patent 3,218,673 **Field 13H**
HOT PRESSING ZIRCONIA.
Patent assigned to Air Force,
by Lawrence B. Robinson, Fred W. Vahldick and Charles T. Lynch. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Refractory materials, Material forming), (*Zirconium compounds, Oxides), Hot working, Borides, Nitrides, Silicides, Inorganic compounds, Patents.

Identifiers: Zirconium oxide.

The apparatus is for shaping of forming dense zirconium oxide bodies at up to 30,000 atmospheres and 2,000 degrees C. The products have a uniform, finegrained structure. Various inorganic materials may be formed including oxides of hafnia, titania, carbides such as titanium carbide, the borides such as zirconium diboride, the nitrides such as hafnium nitride and the silicides such as zirconium disilicide.

Patent 3,218,703 **Field 13H, 19A**
HINGE WELDS FOR ROD WARHEAD.
Patent assigned to Navy,
by Gilbert W. Ousley. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Continuous rod warheads, Welding), (*Welding, Continuous rod warheads), Patents.

A method is disclosed of welding the rods of continousrod-type warheads so as to form hinge welds upon which the rods pivot to form a continuous loop or ring when expanded by detonation of an explosive charge housed within the warhead. The end portions of each of the rods of the inner and outer cylinder are chamferred, or bevelled, on a pair of adjacent edges. The rods of the inner cylinder are then superposed on the rods of the outer cylinder in a suitable jig with the chamfers supercoincidentally positioned to form V-shaped troughs or notches on the sides of the rods between the abutting faces of the superposed rods. Weld material is then deposited in the troughs to bond the rods together substantially at the end portions. With the rods retained in the jig, the excess weld material is removed simply by passing a grinder or milling burr between adjacent rods in the jig.

Patent 3,218,781 **Field 13A, 13H**
ELECTROSTATIC APPARATUS FOR REMOVAL OF DUST PARTICLES FROM A GAS STREAM.
Patent assigned to AEC,
by Rudolph T. Allemann, Robert L. Moore and U. L. Upson. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Gases, Material removal), (*Electrostatic precipitation, Dust), Radioactive waste, Bubbles, Cleaning, Particles, Patents.

A radioactive particle-laden gaseous stream is led through a field of electrical discharge, whereupon the particles entrained in the stream become individually charged, and thereafter the stream is led through small openings in a vessel containing a conductive liquid at a different electrical potential from that of the particles. On passing through the openings of the vessel and emerging into the liquid, bubbles are formed, and because of the difference in potential between the particles and the liquid they are immediately attracted to the surface of the bubbles where they enter the liquid either by being dissolved or suspended; the gas within the bubbles is thereby scrubbed of its entrained particles and escapes from the top of the liquid without them. The device is called an electrostatic bubble scrubber.

PB-168 629 **Field 13A, 13J**
CFSTI Prices: HC$2.00 MF$0.50
Naval Engineering Experiment Station, Annapolis, Md.
CHEMICAL CLEANING OF LOW PRESSURE SEAWATER EVAPORATORS,
by Leonard S. Buchoff and Frank E. Clarke. 28 Aug 53, 37p EES-010004
Proj. NSM-611-077

Descriptors: (*Evaporators, Cleaning), Seawater, Salts, Cleaning compounds, Hydrochloric acid, Instruction manuals.

Methods of cleaning low-pressure, sea-water evaporators were investigated. Circulation of dilute, muriatic acid, appears to be the most practicable cleaning method for naval use. A manual of instructions for cleaning by this method is included. (Author)

PB-168 677 **Field 13B, 13H, 11B, 11G**
CFSTI Prices: HC$8.20 MF$2.25
Bureau of Public Roads, Washington, D. C. Office of Research and Development.
HIGHWAY CONFERENCE ON RESEARCH AND DEVELOPMENT OF QUALITY CONTROL AND ACCEPTANCE SPECIFICATIONS USING ADVANCED TECHNOLOGY. VOL. 1: QUALITY CONTROL TECHNIQUES; PROCEEDINGS.
Apr 65, 518p
See also PB-168 678.

Descriptors: (*Symposia, Roads), (*Quality control, Roads), (*Roads, Quality control), Specifications, Acceptability, Civil engineering, Materials, Concrete, Asphalt, Structural properties, Foundations (Structures), Statistical analysis.

PB-168 678 **Field 13B, 13H, 11G**
CFSTI Prices: HC$6.00 MF$1.25
Bureau of Public Roads, Washington, D. C. Office of Research and Development.
HIGHWAY CONFERENCE ON RESEARCH AND DEVELOPMENT OF QUALITY CONTROL AND ACCEPTANCE SPECIFICATIONS USING ADVANCED TECHNOLOGY. VOL. 2: ASPHALT TECHNOLOGY PROCEEDINGS.
Apr 65, 217p
See also PB-168 677.

Descriptors: (*Symposia, Roads), (*Quality control, Roads), (*Roads, Asphalt), (*Asphalt, Roads), Specifications, Acceptability, Civil engineering, Performance (Engineering), Structural properties.

PB-168 785 **Field 13B, 6F, 7B, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
A SERIAL-DILUTION APPARATUS FOR CONTINUOUS DELIVERY OF VARIOUS CONCENTRATIONS OF MATERIALS IN WATER,
by Donald I. Mount and Richard E. Warner. Jun 65, 19p
PHS Pub-999-WP-23
Rept. on Environmental Health Series. Water Supply and Pollution Control.

Descriptors: (*Water, Chemical analysis), (*Minerials, Concentration (Chemistry)), (*Laboratory equipment, Design), Water pollution, Aquatic animals, Poisoning, Sewage, Monitors.

The paper describes a serial-dilution apparatus designed to deliver continuously a series of different concentrations of a material in water. The materials needed for construction normally would be available in a chemistry laboratory. No electrical power is needed for operation, and the apparatus will remain accurate even if the influent waterflow varies over a wide range. It maintains accuracy of 10 percent or less for periods of time up to 30 days or more with very little servicing or adjustment, and the cost is $50 or less. (Author)

PB-168 788 **Field 13B, 6H**
CFSTI Prices: HC$1.00 MF$0.50
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
DUCK-PROCESSING WASTE,
by Grover L. Morris. Jul 65, 17p
PHS Pub-999-WP-31
Rept. on Environmental Health Series. Water Supply and Pollution Control.

Descriptors: (*Wastes (Industrial), Disposal), (*Water supplies, Industries), (*Food, Industrial processing), Birds, Natural resources, Water pollution, Sewage, New York.

Two duck-processing plants located on Long Island were studied to obtain waste load and water use data for comparison with chicken processing data. Weighted averages for both plants studied indicate water use of 23.6 gallons and waste loads of 0.0419 pound BOD and 0.0289 pound of suspended solids per duck processed. Similar values for chicken processing are 8 gallons of water, 0.025 pound of BOD, and 0.013 pound of suspended solids per bird. Comparisons between duck and chicken processing on the basis of 1,000 pounds of live birds indicate water usage is 3,600 gallons for ducks and 2,300 gallons for chickens; BOD values are 6.4 pounds for ducks and 7.18 pounds for chickens; and suspended solids values are 28.9 pounds for ducks and 13 pounds for chickens. Waste water coliform values were 56,800 per 100 milliliter in plant A and 49,200 per 100 mililiter in plant B. (Author)

PB-168 789 **Field 13B, 14B, 6E**
CFSTI Prices: HC$3.00 MF$0.75
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
WATER OXYGEN DEMAND NO. 2. STUDY NUMBER 21.
1965, 84p
PHS Pub-999-WP-26
Rept. on Environmental Health Series. Water Supply and Pollution Control.

Descriptors: (*Water pollution, Test methods), (*Public health, Water pollution), Chlorides, Oxidation, Mercury compounds, Sulfates, Statistical data.

Identifiers: Chemical Oxygen Demand.

The study consisted of four samples which 74 participating laboratories were instructed to dilute to a specified volume and analyze by both the Standard Method for Chemical Oxygen Demand and by the Mercuric Sulfate modification. The results from this study indicate that the two procedures produce similar precision and accuracy when no interfering materials are present. When interferences due to high concentrations of chloride are present, the standard method will produce equal precision and accuracy only if the appropriate corrective techniques are applied. The Mercuric Sulfate modification is the method of choice for COD measurement since with less manipulation it effectively removes the interference due to chloride oxidation and is less time consuming. (Author)

PB-168 790 **Field 13B, 10B**
CFSTI Prices: HC$1.00 MF$0.50
Weather Bureau Research Station, Cincinnati, Ohio.
POTENTIAL DISPERSION OF PLUMES FROM LARGE POWER PLANTS,
by Francis Pooler, Jr. 1965, 17p
PHS Pub-999-AP-16
Rept. on Environmental Health Series. Air Pollution.

Descriptors: (*Power plants (Establishments), Waste gases), (*Waste gases, Scattering), (*Air pollution, Power plants (Establishments)), Concentration (Chemistry), Meteorological parameters, Numerical analysis.

Expected ground-level concentrations resulting from emissions from large power plants are discussed for three meteorological situations considered to be most likely to result in significant air pollution concentrations. These situations are (1) high wind; (2) inversion breakup; and (3) limited mixing layer with a light wind. Effects of increasing stack height are discussed for each situation. Numerical examples based on calculations included as an appendix are shown. (Author)

PB-168 791 **Field 13B, 6F, 14B**
CFSTI Prices: HC$7.00 MF$1.50
Public Health Service, Washington, D. C. Div. of Air Pollution.
ENVIRONMENTAL MEASUREMENTS: VALID DATA AND LOGICAL INTERPRETATION; SYMPOSIUM.
Jul 64, 309p

PHS Pub-999-AP-15,
PHS Pub-999-WP-15
Rept. on Environmental Health Series. Air Pollution and Water Supply and Pollution Control.

Descriptors: (*Environment, Measurement), (*Air pollution, Measurement), (*Water supplies, Measurement), Water pollution, Test equipment, Meteorological instruments, Sampling, Statistical analysis, Transducers, Experimental data, Experimental design, Information retrieval, Physiology, Data processing systems, Hydrology, Display systems, Graphics, Periodic variations, Aquatic animals, Geochemistry, Symposia.

The following papers are included: Information engineering - new frontier of technology; Objectives of measurement systems; The design of measurement systems; Parameters; Sampling and statistical design; Transducers; Classification systems for transducers and measuring systems; Data validation; The storage and retrieval of data for water quality control - summary; Data acquisition systems in air quality; Data acquisition systems in meteorology; Data acquisition systems in physiology; Data acquisition systems in water supply; Data acquisition systems in water quality control; Data acquisition systems in hydrology; The interpretation and analysis of hydrological data; Data display for analysis; Techniques for data analysis; Interpretations and conclusions; Summation; Determining basic relationships between variables; Interpretation of trends and cycles; Data interpretation (air) - drawing conclusions; The interpretation of biological data with reference to water quality; Chemistry of natural waters in relation to water quality; Data interpretation (water) - drawing conclusions.

PB-168 795 **Field 13B**
CFSTI Prices: HC$3.00 MF$0.75
Dow Industrial Service, Cleveland, Ohio.
EVALUATION OF THE USE OF ACTIVATED CARBONS AND CHEMICAL REGENERANTS IN TREATMENT OF WASTE WATER.
Rept. for 26 Dec 60-28 Feb 61,
by R. L. Johnson, F. J. Lowes, Jr., R. M. Smith, andT. J. Powers. May 64, 57p
Contract SAph-76290
AWTR 11,
PHS Pub-999-WP-13

Descriptors: (*Wastes (Sanitary engineering), Processing), (*Water supplies, Purification), (*Carbon black, Effectiveness), Sewage, Degradation, Oxidizers, Hydrogen peroxide, Adsorption, Economics.

The capacities of six activated carbons for the soluble organics in filtered secondary effluent were obtained by use of a continuous-flow, column-type test. Results varied from 7 to 13 grams COD per 100 grams of carbon. Because of the manner in which the test was carried out, only the carbon with the smallest capacity was loaded to the maximum extent possible. The chemical regeneration of exhausted carbon was investigated by use of nine inorganic oxidizing agents. Only hydrogen peroxide was capable of restoring measurable adsorption capacity after more than two cycles of exhaustion and regeneration. The economic feasibility of chemical regeneration is not promising. (Author)

PB-168 796 **Field 13B, 5C**
CFSTI Prices: HC$5.00 MF$1.00
Louis Koenig-Research, San Antonio, Tex.
ULTIMATE DISPOSAL OF ADVANCED-TREATMENT WASTE. PART I. INJECTION. PART 2. PLACEMENT IN UNDERGROUND CAVITIES. PART 3. SPREADING,
by Louis Koenig. May 64, 154p
AWTR 8,
PHS Pub-999-WP-10
Rept. on Environmental Health Series, Water Supply and Pollution Control.

Descriptors: (*Wastes (Sanitary engineering), Disposal), (*Sewage, Disposal), (*Disposal, Costs), (*Water supplies, Purification), Injection, Drilling, Water wells, Pumps, Storage, Underground structures, Economics, Mining engineering, Underground explosions.

Cost estimates are made for ultimate disposal of the contaminants resulting from complete renovation of a municipal waste water. For injection, these costs varied from $0.13 to $27 per 1,000 gallons injected (7,000 ft., 260 psi wellhead pressure, 1.187 fluid density) as the capability decreased from 2 million to 1,000 gallons per day. For cavities mined by conventional methods, fixed costs alone vary from $243 to $72 per 1,000 gallons at capabilities of 1,000 and 10 million gallons per day, respectively. Costs for disposal in cavities created by nuclear blasting are highly speculative. Fixed costs vary from $139 to $0.269 per 1,000 gallons as the capability increases from 1,000 to 10 million gallons per day. Spreading is by far the cheapest disposal method. Cost varied from $0.30 to $0.001 per 1,000 gallons as the capability varied from 1,000 (0.4-foot-per-day infiltration rate) to 10 million gallons per day (4.0-feet-per-day infiltration rate). Land costs between $25 and $1000 per acre were considered and, in this range, had very little effect on over-all cost.

PB-168 866 **Field 13B**
CFSTI Prices: HC$5.00 MF$1.00
Public Health Service, Cincinnati, Ohio. Div. of Air Pollution.
A STUDY OF AIR POLLUTION IN THE INTERSTATE REGION OF LEWISTON, IDAHO, AND CLARKSTON, WASHINGTON.
Dec 64, 167p PHS-Pub-999-AP-8

Descriptors: (*Idaho, Air pollution), (*Washington (State), Air pollution), Waste gases, Meterological parameters, Sulfur compounds, Odors, Wastes (Industrial), Public opinion, Law.

The purpose of the study was to determine the nature and extent of air pollution in the Lewiston-Clarkston area and to assemble information to be used as a basis for technical and official action needed to conserve air quality in the area. Because of its unique valley location, the two-city area is susceptible to meteorological conditions conductive to pollutant accumulation. Either city contaminate the other, and this creates a multijurisdictional problem that requires joint and cooperative action to control air pollution. As a first step to solve the problem, an Air Resources Management Council consisting of county, city and state officials is to be organized. This council will be responsible for planning surveys and studies to determine air quality guides and legislation and administration necessary to control air pollution in this multijurisdictional area. The Public Health Service in its advisory capacity will provide technical assistance. (Author)

PB-168 867 **Field 13B, 13H**
CFSTI Prices: HC$4.00 MF$1.00
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
AIR POLLUTION ASPECTS OF THE IRON AND STEEL INDUSTRY,
by Jean J. Schueneman, M. D. High and W. E. Bye. Jun 63, 128p
PHS Pub-999-AP-1
Rept. on Environmental Health Series. Air Pollution.

Descriptors: (*Iron industry, Air pollution), (*Air pollution, Iron industry), Manufacturing methods, Furnaces, Waste gases, Control, Sintering, Public health, Law.

The report is a summary of published and other information on the air pollution aspects of the iron and steel industry, including coke plants incident thereto. Processes, equipment, and raw materials are briefly described. The magnitude and location of plants and process trends are noted. Air pollutant emissions and means for their control are discussed in detail, with respect to sintering; coke production; blast furnaces; open hearth, Besemer, electric, and basic oxygen steelmaking furnaces; and other operations. The effects of pollutants on community air quality are described, and knowledge of health aspects of pollutants is summarized. Laws regulating pollutant emissions are given, and control equipment and measures needed to comply with certain laws are listed. (Author)

PB-168 868 **Field 13B**
CFSTI Prices: HC$3.00 MF$0.50
Oklahoma State Dept. of Health, Oklahoma City. Occupational Health Section.
OK AIR FOR THE OK STATE: A REPORT ON THE APPRAISAL OF AIR POLLUTION IN OKLAHOMA,
by J. Dale McHard and Richard F. Wromble. Jan 65, 66p
Prepared in cooperation with Div. of Air Pollution, Public Health Service.

Descriptors: (*Oklahoma, Air pollution), (*Air pollution, Oklahoma), Waste gases, Control, Measurement, Meteorological parameters, Population, Economics, Law.

There is assurance that Oklahoma is on the threshold of economic expansion that will require vigilance to prevent new air pollution. Analysis of available information reveals that there is no effective air pollution control program in existence in the state. By the same token, there is no procedure whereby effective action can be taken by governmental agencies to prevent the occurrence of new air pollution. At present, the only legal mechanism for securing abatement of air pollution problems is through enforcement of cumbersome and inadequate nuisance laws. These laws require that health must have already been injuriously affected before abatement can be accomplished. With this limited legal basis, the State Department of Health cannot provide effective leadership and action in this important area of environmental health. Suggestions for consideration in establishing an effective air pollution control program are presented in the Legislation Section of this report. The features suggested have been selected as the most desirable for Oklahoma conditions. (Author)

PB-168 875 **Field 13B, 6E**
CFSTI Prices: HC$4.00 MF$0.75
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
COMMUNITY PERCEPTION OF AIR QUALITY: AN OPINION SURVEY IN CLARKSTON, WASHINGTON,
by Nahum Z. Medalia and A. L. Finkner. Jun 65, 115p
PHS Pub-999-AP-10
Rept. on Environmental Health Series. Air Pollution.

Descriptors: (*Air pollution, Public opinion), Damage, Buildings, Paints, Urban areas, Odors, Public health, Attitudes, Washington (State).

In a community with a population of 7,000 and located approximately 4 miles downwind from a pulp mill, a public opinion survey was taken to analyze the environmental stress of air pollution on a sample of household heads and spouses, along two principal attitudinal dimensions: awareness and concern. Of those interviewed, 91 percent perceived air pollution in the community as a malodor problem; 74 percent perceived it as a problem of visibility; and 62 percent as a problem of nose-throat irritation. A Guttman-type scale showed high concern with air pollution among 48 percent of the sample; low to moderate concern among 31 percent; and minimal concern among 21 percent. Although exposure to odorous pollutants in ambient air appeared roughly equal for all members of the sample, their concern with air pollution was found to vary directly with social status and attitude characteristics such as civic pride, desire to ameliorate the situation, length of residence in the community, and occupational prestige of the household head. (Author)

PB-168 876 **Field 13B, 6J, 6H, 6E**
CFSTI Prices: HC$1.00 MF$0.50
Public Health Service, Cincinnati, Ohio. Div. of Air Pollution.
AIR POLLUTION IN THE COFFEE ROASTING INDUSTRY,

by Frank Partee. Sep 64, 20p PHS-Pub-999-AP-9
Rept. on Environmental Health Series.

Descriptors: (*Air pollution, Industries), (*Public health, Air pollution), (*Coffee, Processing), Emissivity, Dust, Odors, Smokes, Urban areas, Control.

The review provides a guide for the inventorying and control of emissions arising from coffee processing. Information was collected from published literature and other sources. Emission factors were established for the various processes involved, i.e. roasting, stoning, and cooling. The air pollution aspects of the production of regular grades, instant, and decaffeinated coffee are discussed. Also discussed are the types and operating characteristics of control equipment used. (Author)

PB-168 877 **Field 13B**
CFSTI Prices: HC$3.00 MF$0.75
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
DYNAMIC IRRADIATION CHAMBER TESTS OF AUTOMOTIVE EXHAUST,
by Merrill W. Korth. Nov 63, 55p
PHS Pub-999-AP-5
Rept. on Environmental Health Series. Air Pollution.

Descriptors: (*Exhaust gases, Radiation damage), (*Air pollution, Exhaust gases), Density, Exhaust systems, Test facilities, Passenger vehicles, Radiation effects Bacteria, Plants (Botany), Animals, Fuels.

As part of an intensive study by government and private agencies the U. S. Public Health Service has built an irradiation chamber facility for investigation of irradiated auto exhaust under mixing conditions similar to those in the atmosphere. The facility consists of a programmed continuous-cycling chassis dynamometer, an exhaust dilution system, a dilution-air purification system, two irradiation chambers, and exposure facilities for evaluation of bacteria kill, plant damage, and various effects on small animals. Of the three variables studied during the first test series, the exhaust concentration at the start of irradiation appeared to produce the most significant effects. Fuel composition had a lesser influence. Very little difference was noted in the effects produced at two different average irradiation times. (Author)

PB-168 888 **Field 13B, 6E**
CFSTI Prices: HC$3.00 MF$0.75
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
A PILOT STUDY OF AIR POLLUTION IN JACKSONVILLE, FLORIDA,
by James P. Sheehy, John J. Henderson, Charles I. Harding and Anthony L. Danis. Apr 63, 65p
PHS Pub-999-AP-3

Descriptors: (*Air pollution, Florida), (*Public health, Air pollution), Urban areas, Fluorides, Sulfur compounds, Dioxides, Hydrogen compounds, Sulfides, Hydrocarbons, Nitrogen compounds, Oxides, Carbon dioxide, Carbon monoxide, Aldehydes, Ketones, Meteorological parameters, Damage.

The objectives of this pilot study were to develop a preliminary evaluation of air pollution in Jacksonville and to determine whether fluoride and sulfur dioxide concentrations were sufficient to cause damage to vegetation that had occurred in the area. The study consisted of an emission inventory, a meteorological investigation, an intensive short-term study of downtown Jacksonville, and an industrial area study. Pollutants sampled for included sulfur dioxide, oxidants, nitrogen dioxide, carbon monoxide, hydrogen sulfide, fluorides, and suspended particulates. During the study fluoride concentrations were high enough in certain parts of the city to cause damage to sensitive plants; sulfur dioxide and oxidants were also present at significant levels. Results of the study also indicated that photochemical smog is produced over Jacksonville, that pollutants from Jacksonville are transported across the St. John's River, and finally, that several pollutants constitute a potential problem in the city and should be evaluated further. (Author)

PB-168 977 **Field 13B, 6E**
CFSTI Prices: HC$3.00 MF$0.75
Louis Koenig-Research, San Antonio, Tex.
ULTIMATE DISPOSAL OF ADVANCEDTREATMENT WASTE. PART I. WET OXIDATION. PART II. INCINERATION,
by Louis Koenig. Oct 63, 78p
Contract SAph-78083
PHS Pub-999-WP-3,
AWTR 3
Environmental Health Series. Water Supply and Pollution Control.

Descriptors: (*Public health, Water pollution), (*Water supplies, Purification), (*Disposal, wastes (Sanitary engineering)), (*Water (Sanitary engineering), Costs), Oxidation, Evaporation, Incinerators, Industrial plants, Urban areas, Transportation.

Cost estimates are made for ultimate disposal of the concentrated contaminants resulting from complete renovation of a municipal waste water. The processes investigated are wet oxidation (Zimmerman Process) and incineration. For wet oxidation, plant costs vary from $4 to $80 per gallon of concentrate per day capacity (10,000,000 to 1,000 gallons per day). Operating costs vary from $1.40 to $35 per thousand gallons of feed. Pre-evaporation could reduce costs. Fixed costs constitute a large proportion (8 figures, 19 references). For incineration, estimates of the cost of pre-evaporation to 30 percent solids and hauling of the ash were included. A flash dryer-Nichols Herreshoff furnace combination was selected. Costs per 1,000 gallons of concentrate varied from $0.57 (10,000,000 gallons per day, 300 ppm) to $68 (1,000 gallons per day, 3000,000 ppm). Corresponding unit investment costs were $1.53 and $108 per gallon per day capacity (11 figures, 30 references). (Author)

PB-168 999 **Field 13J**
CFSTI Prices: HC$2.00 MF$0.50
Maritime Administration, Washington, D. C.
SURFACE EFFECT SHIPS, A NEW ERA IN COMMERCIAL OCEAN TRANSPORTATION,
by James A. Higgins. 1965, 34p
Prepared for presentation at the National Meeting of the Society of Automotive Engineers, Washington, D. C., 14 Apr 65.

Descriptors: (*Merchant vessels, Performance (Engineering)), Specifications, Operation, Feasibility studies, Shipping (Marine), Ships (Nonmilitary), Ground effect machines.

Identifiers: Surface effect ships.

The paper briefly reviews the economic history of the merchant marine, and discusses the effect that a declining merchant marine may have on the nation in general. The text discusses six requirements that a ship concept should have in order to meet the requirements for successful operation under American flag operations and compares our presently subsidized ship operation with that of our unsubsidized foreign aircraft operations. Five of the most promising surface effect ship concepts are discussed and a comparative analysis is made of the five machines in operation. Finally, the surface effect ships are compared against the six criteria originally laid down as requirements for successful economic merchant marine ship operation. The paper concludes that surface effect ships are economically and theoretically sound, technically feasible, and that such ships would be insensitive to the labor rate differential between American labor and our foreign competition. Further, the SES has vehicle characteristics capable of restoring the American merchant marine to its original vigorous state as a world leader in marine transportation, without requiring Government subsidy to survive. (Author)

PB-169 016 **Field 13A, 13J**
Naval Engineering Experiment Station, Annapolis, Md.
PERFORMANCE OF PLAIN AND DUPLEX CONDENSER TUBES AT HIGH WATER VELOCITIES.
Research and development rept.,
by J. L. Basil. 16 Dec 57, 15p EES-040020C
Proj. NS-643-078
Availability: Reference only at CFSTI after original stock is exhausted.

Descriptors: (*Condensers (Liquefiers), Performance (Engineering)), Heat transfer, Shipborne, Velocity, Sea water, Corrosion, Pipes, Titanium alloys, Copper alloys, Nickel alloys, Molybdenum alloys, Iron alloys, Chromium alloys, Tungsten alloys, Corrosion-resistant alloys.

Plain and duplex condenser tubes (5/8 in. OD) of titanium and Hastelloy C, and cupro-nickel (70-30 and 90-10) of Military Specification MIL-T-15005B, were tested for resistance to sea water corrosion in model condensers of 20 tubes each. Duplex tubes were 90-10 Cu-Ni alloy lined with Hastelloy C or titanium. Natural sea water was pumped through the tubes at a velocity of 20 ft/sec. The cupro-nickel tubes suffered serious corrosion damage within 10 months. Titanium and Hastelloy C tubes, both plain and duplex, were undamaged after 24 months. (Author)

PB-169 066 **Field 13K**
CFSTI Prices: HC$2.00 MF$0.50
David Taylor Model Basin, Washington, D. C.
ANALYSIS OF MODERN PROPELLER-PUMP DESIGN,
by W. Spannhake. Jun 48, 29p Rept. no. 621
ATI 63838

Descriptors: (*Propeller pumps, Design), Analysis, Turbines, Hydrodynamics, Aerodynamics, Theory.

The main principles of the elementary theory of turbines and pumps first developed by Euler and the application of this theory to the particular problem of propeller pumps are presented. The results which can be obtained with the elementary theory and certain limitations of it are explained. The use of modern hydro- and aerodynamical concepts for establishing a more exact theory is outlined. A criticism of this modern theory is added and suggestions are made for further theoretical and experimental research work in this field. (Author)

PB-169 114 **Field 13M**
CFSTI Prices: HC$3.00 MF$0.75
Forest Products Lab., Madison, Wis.
DISTRIBUTION TO WHEEL LOADS ON TIMBER BRIDGES.
Research paper,
by E. C. O. Evickson and K. M. Romstad. Dec 65, 64p FPL-44

Descriptors: (*Bridges, Load distribution), Vehiclewheels, Loading (Mechanics), Wood, Roads, Elasticity, Shear stresses.

The results obtained in field tests of five typical forestroad bridges and in U.S. Forest Products Laboratory tests of Three full-size bridge decks are presented and their performance is compared with design requirements and with a theoretical analysis. Design recommendations are given confirming present design practice when wheel loads are in position for maximum bending moment in the stringers, but showing a greater distribution of loads than is now assumed when loads are in position for maximum shear. Excellent agreement was noted between experimental and theoretical results for the 6-, 7-, and and 12-stringer decks constructed at the U.S. Forest Products Laboratory. By theoretical computations, the reaction for load in position for maximum moment (in all three superstructures) did not exceed 25 percent of the wheel load, nor exceed 41 percent of the wheel load for loads positioned 3 feet from the reaction. (Author)

PB-169 121 **Field 13B, 13F, 13M**
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge.
HIGH PRIORITY RESEARCH TASKS FOR HIGH SPEED GROUND TRANSPORT.
Part 2.
15 Jun 65, 73p
Contract C-85-65

Descriptors: (*Transportation, Research program administration), Railroads, Roads, Vehicles, Traffic, Scheduling, Optimization, Civil engineering, Mechanical engineering, Systems engineering, Cost effectiveness.

Identifiers: High-speed passenger transportation.

This volume represents Part II of a four part report prepared in partial fulfillment of a Contract initiated in September 1964 between the Massachusetts Institute of Technology and the United States Department of Commerce. The following proposals for additional research of high priority are divided into two groups: technological studies and design studies. The technological studies constitute applied research in various technical areas essential to the realization of a HSGT system. Their purpose is to establish the current state of the art, to determine which lines of attack are technically promising, to ascertain the practical and theoretical feasibility of various design alternatives, and to extend the state of present knowledge to the point where the design of an HSGT system will be a practical possibility. The purpose of the design studies is to generate alternative ideas and proposals for network configuration, access methods, guideway structures, vehicle designs, propulsion, suspension, control, communication, and all other components of the system.

RL-SA-31 **Field 13K, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Hanford Atomic Products Operation. Richland, Wash.
PRESSURE DROP CHARACTERISTICS OF TWO ECCENTRICALLY POSITIONED ORIFICES IN SERIES. I. EFFECT OF ECCENTRICITY, SPACING OF ORIFICES AND OF THE ORIFICE TO PIPE DIAMETER RATIO.
Master's thesis,
by James Darrel Agar. 4 Jun 65, 96p
Contract AT (45-1)-1350

Descriptors: (*Pipes, Pressure), (*Orifices, Pipes).

SB-449 Suppl. 1 **Field 13A, 9E, 13I, 18I**
Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
COOLING AND COOLANTS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT, TURBINES AND REACTORS.
Price list, selective bibliography of Government research repts. and translations for Jan 61-Apr 65. Apr 65, 33p
Available free from the Clearinghouse.

Descriptors: (*Cooling + ventilation equipment, Bibliographies), (*Coolants, Bibliographies), Electrical equipment, Electronic equipment, Turbines, Reactor coolants.

The bibliography lists 549 domestic and foreign references on cooling and coolants for electrical and electronic equipment, turbines added to the collection from January 1961 through April 1965. Includes research on electron cooling, cryogenic solid cooling techniques, air and liquid cooling of electronic equipment, cooling avionic equipment, water cooled nuclear reactors, oil cooling systems, liquid coolants and gas-cooled reactor coolants. (Author)

TID-20625 (vol 1) (rev 1) **Field 13H, 18J**
CFSTI Prices: HC$6.00 MF$1.50
Hanford Atomic Products Operation, Richland, Wash.
WELDING PROCEDURES. VOLUME I. PROCEDURE SPECIFICATIONS, WELDING PROCEDURE QUALIFICATION TEST RECORDS (HWS-7171 THROUGH HWS-7172 SERIES).
1964, 298p HWS-7170

Descriptors: (*Welding, Reactor system components).

TID-20625 (vol 4) (rev 1) **Field 13H, 18J**
CFSTI Prices: HC$6.00 MF$1.50
Hanford Atomic Products Operation, Richland, Wash.
WELDING PROCEDURES. VOLUME IV. PROCEDURE SPECIFICATIONS, WELDING PROCEDURES, AND PROCEDURE QUALIFICATION TEST RECORDS (HSW7600 THROUGH HWS-8091 SERIES).
1964, 265p

Descriptors: (*Welding, Reactor system components).

14. METHODS AND EQUIPMENT

ACF-6 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
ACF Industries, Inc., Albuquerque, N. Mex.
ELECTRON MICROPROBE DATA QUANTIFICATION. AN ANALYTICAL CHEMISTRY EVALUATION,
by J. D. Allen and Jacob Sandoval. 1 Jun 65, 19p
ACF-413-244
Contract AT (29-1)-1352

Descriptors: (*Probes, Electrons), (*Materials, Separation).

AD-460 155 **Field 14B, 1A**
CFSTI Price: HC$1.00
Ballistic Research Labs., Aberdeen Proving Ground, Md.
SIMULTANEOUS STREAK AND FRAME INTERFEROMETRY FOR USE IN SHORT DURATION HYPERVELOCITY FACILITIES,
by Joseph H. Spurk and Donald D. Shear. Dec 64, 24p BRL-1266
Proj. RDT/E-1A222901A201

Descriptors: (*Interferometers, Gas flow), (*Gas flow, Measurement), Shock tubes, Nonequilibrium flow, Test facilities.

A unique instrumentation system for simultaneous investigation of free stream and flows around a model in an expansion tube is described. A Mach-Zehnder interferometer with the proper combination of masks, filters, a dichroic mirror and a rotating mirror, is used. Streak interferograms of 400 microsec duration and framing records of 1 microsec duration are obtained. A streak interferogram in green monochromatic light gives a continuous history of the free stream flow, while single frame interferograms in blue monochromatic light record the flow field about the model. The streak interferogram, in addition to monitoring quality of free stream flow, can be used in conjunction with pressure, wavevelocity measurements and perfect gas theory to determine free stream conditions, notably static temperature, as necessary for the study of the flow around the model. An interferogram yields the local optical refractivity, which is a variable of state. For many applications, including the anticipated free stream conditions, this variable is simply proportional to density. The local refractivity measured from the frame interferograms of flow around models can immediately be compared with theoretical predictions, even though the flow be reacting. The exact time of each interferogram frame is selected and indexed directly on the streak photograph. The system readily converts to a twowavelength streak interferometry system for investigation of flows with ionization. (Author)

AD-467 828 **Field 14B, 1A**
CFSTI Prices: HC$2.00 MF$0.50
Aeroelastic and Structures Research Lab., Massachusetts Inst. of Tech., Cambridge.
PRESSURE PROBE AND SYSTEM FOR MEASURING LARGE BLAST WAVES.
Technical rept.,
by J. Ray Ruetenik and S. Dean Lewis. Jun 65, 45p ASRL-TR-105-2
Contract AF33 (616)-8499,
Proj. AF-5710
AFFDL TDR-65-35

Descriptors: (*Shock waves, Measurement), (*Pressure gages, Detonation waves), Blast, Pressure, Transducers, Shock tubes, Aerodynamic loading, Model tests, Performance (Engineering).

A new pancake-type pressure probe was developed for the measurement of blast pressure waves during the BIG SEA sled tests. This probe employs transducers of the type selected for wing pressure measurements in that program. It was evaluated in the shock tube under a range of flow Mach numbers encountered during the test. From these shock tube tests, a probe form calibration was determined. Application of this type of probe to the BIG SEA tests is also described, including the mounting system, transducer and electronic calibration, and one blast wave record derived from this type of probe is presented. The results of the shock-overpressure measurements are compared with other test data. The pancake probe has a diameter of 4 inches and a thickness of 0.5 inch. The accuracy of measurement has been determined to be 3-5% of the shock overpressure for blast waves where the positive duration is 10 milliseconds or greater. The response time has been found to be less than 0.7 milliseconds. (Author)

C13.46-261 **Field 14E**
CFSTI Price: MF$0.50
National Bureau of Standards, Washington, D. C.
SUMMARY OF CURRENT RESEARCH ON ARCHIVAL MICROFILM,
by C. S. McCamy and C. I. Pope. 16 Apr 65, 29p
Technical note TN-261
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.25.

Descriptors: (*Microfilm, Storage), Aging (Materials), Photographic film, Silver, Gelatins, Iodides, Ions, Photographic chemicals, Peroxides, Hydrogen peroxide, Microorganisms, Density, Gold.

The discovery of aging blemishes on microfilm in storage has prompted a study of the statistical relationship of incidence to conditions of preparation and storage, the chemical and physical nature of the blemishes, and measures to be taken to prevent their formation. This paper is a report of progress in that study with recommendations based on current information. With few exceptions, reports of aging blemishes refer to negative silver-gelatin type microfilm in roll form. Extremely small amounts of information loss have been reported. In some large collections of microfilm, no blemishes have been found. No evidence of biological attack has been found. Apparently, image silver is ionized, migrates, and is reduced to colloidal silver. The reaction often proceeds in the manner described by Liesegang for other silvergelatin systems. In laboratory tests, blemishes formed in the presence of minute amounts of peroxides, certain imbibed chemicals, and solid contaminants. Recommendations include: avoiding excessive densities on film, careful avoidance of physical damage to the image layer, the use of a small concentration of iodide ion in the fixer, thorough washing, uniform drying, storage at low temperature and humidity in sealed cans, careful avoidance of airborne reactants, increased use of positive copies for archival storage, and careful periodic inspection of record films. (Author)

C13.46-263 **Field 14B**
CFSTI Price: MF$0.50
National Bureau of Standards, Washington, D. C.
DISCLOSURES ON A PRECIPITATION INDICATOR, MOISTURE DETECTOR, VACUUM BALL VALVE, FILM STRIP PRINTER, NORMAL INCIDENCE INTER- FEROMETER, COLOR SORTER, AND COAXIAL T,

207-794 O - 66 - 16

by David Robbins and Alvin J. Englert. 18 Jun 65, 32p Technical note TN-263
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.25.

Descriptors: (*Meteorological instruments, Specifications), (*Rotary valves, Specifications), (*Electrophotography, Specifications), (*Interferometers, Specifications), (*Coaxial cables, Specifications), Wiring diagrams, Mechanical drawings, Colorimetry.

Description and drawings of A Capacitance-type moisture detector; A high vacuum ball valve; A selective precipitation indicator system; Apparatus for printing copies from film strips; Apparatus for color sorting small, irregularly-shaped articles; Coaxial T for radiofrequency voltmeter calibrations; and A normal incidence interferometer.

N66-10329 **Field 14B, 1A**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
CALIBRATION OF CONICAL PRESSURE PROBES FOR DETERMINATION OF LOCAL FLOW CONDITIONS AT MACH NUMBERS FROM 3 TO 6.
Technical note,
by John D. Norris. Nov 65, 66p NASA-TN-D-3076

Descriptors: (*Pressure gages, Calibration), (*Hypersonic flow, Pressure gages), (*Supersonic flow, Pressure gages).

N66-10603 **Field 14B, 1A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Edwards, Calif. Flight Research Center.
OPERATIONAL AND PERFORMANCE CHARACTERISTICS OF THE X-15 SPHERICAL, HYPERSONIC FLOWDIRECTION SENSOR.
Technical note,
by Chester H. Wolowicz and Terrence D. Gossett. Nov 65, 18p NASA-TN-D-3070

Descriptors: (*Flowmeters, Hypersonic flow), (*Hypersonic flow, Flowmeters).

Patent 3,217,624 **Field 14E, 17B**
ELECTRICALLY-OPERATED ROTARY SHUTTER.
Patent assigned to NASA,
by Allen G. Ford. 16 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Camera shutters, Remote control systems), (*Television cameras, Camera shutters), Spaceborne, Electrical equipment, Vidicons, Patents.

The electrically-operated rotary shutter is particularly adapted for remote control operation and especially for use on space vehicles, so that the shutter may be automatically operated by controls carried by the spacecraft or by signals sent from a ground station. The shutter is normally closed and is moved by a solenoid, on command, to an open position. It is closed by spring action.

Patent 3,218,547 **Field 14/B, 8N, 20C**
FLUX SENSING DEVICE USING A TUBULAR CORE WITH TOROIDAL, GATING COIL AND SOLENOIDAL OUTPUT COIL WOUND THEREON.
Patent assigned to NASA,
by Sung Ching Ling. 16 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Magnetometers, Design), Magnetic fields, Coils, Geometric forms, Patents.

The flux sensing device includes a tubular highpermeability core of permalloy or ferrite, for example, having a gating flux winding wound on the core in toroid fashion, and a surrounding pick-up coil wound about the core in solenoidal fashion. The tubular magnetic core is uniformly saturated by a gating field provided by application of alternating current to the toroidal gating flux winding, so that residual flux in the core is reduced to a minimum.

Patent 3,218,845 **Field 14B, 13/H**
ULTRASONIC INSPECTION METHOD FOR INACCESSIBLE PIPE AND TUBING.
Patent assigned to AEC,
by Daniel C. Worlton. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Pipes, Non-destructive testing), (*Ultrasonic radiation, Non-destructive testing), Defects (Materials), Metals, Patents.

Ultrasonic plane wates are generated and impinged on the surface of a metal pipe at a predetermined angle of incidence in a first plane passing through the longitudinal axis of the pipe. The ultrasonic waves are also caused to impinge on the surface of the pipe at an angle of incidence in a second plane passing through the longitudinal axis of the pipe normal to the first plane. The ultrasonic waves cause Lamb waves to be excited in the pipe and flow therealong in a helical pattern. Any flaws in the pipe cause reflections of the Lamb waves, which reflections return along the helical pattern to be detected and thereby denote the presence of flaws in the pipe.

Patent 3,218,850 **Field 14B**
THERMO-PROTECTIVE DEVICE FOR BALANCES.
Patent assigned to NASA,
by Vernon L. Rogallo. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Balances, Thermal insulation), Vacuum, Heat sinks, Wind tunnels, Force (Mechanics), Patents.

Models being tested in wind tunnels are mounted upon force balances. The balances are used to make aerodynamic measurements. The balance unit is provided with a heat shield to protect the force balance during tests on a model. The heat shield is made up of inner and outer container members which are spaced apart to form a vacuum chamber.

Patent 3,218,871 **Field 14B, 17H**
ANGULAR ROTATION DETECTION SYSTEM UTILIZING THE DISPLACEMENT OF ELECTRON BEAM.
Patent assigned to Air Force,
by Robert Dressler and Mendel Halberstam. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Rotation, Measurement), (*Interferometers, Rotation), (*Spacecraft, Rotation), Velocity, Cathode ray tubes, Electron beams, Electron microscopes, Electron multipliers, Electrooptics, Patents.

The device is used in a guidance system and detects and measures a change in the angular velocity of a space vehicle about a given axis relative to a predetermined reference angular velocity about that axis. The device is a rotational interferometer in which electrons or ions are utilized instead of light. Since the wavelengths associated with these particles are much shorter than the wavelengths of light a great increase in sensitivity results.

PB-168 882 **Field 14E, 9B**
CFSTI Prices: HC$1.00 MF$0.50
American Mathematical Society, Providence, R. I.
SOLUTION TO THE PHOTON PI-MAT PROBLEM.
Revised ed.
Nov 65, 16p
Grant NSF-G21913

Descriptors: Printing, Automatic), (*Printing techniques, Printing), Photographic equipment.

Identifiers: Photon, Photocomposition.

The pi-mat attachment is an electromechanical device in the photo unit of the Photon which will reproduce through the regular lens system any character which can be photographed or drawn. A quick and inexpensive way of producing pi-mats is given.

PB-169 022 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
GRANITE SURFACE PLATES 24 x 24 INCHES OR LARGER.
Technical manual instrument calibration procedure, MD-14.
1 Sep 65, 22p NAVWEPS-17-20MD-14

Descriptors: (*Laboratory equipment, Surfaces), (*Surfaces, Calibration), Granite, Instruction manuals, Test methods.

The manual describes the calibration procedure for granite surface plates of Grade A (Laboratory) and Grade B (Inspection) that are 24 X 24 inches or larger.

PB-169 023 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
COORDINATE AUTOCOLLIMATOR ABCAA/GAATN OR AADHM/GAATN (ERNST LEITZ, WETZLAR).
Technical manual instrument calibration procedure, ML-15.
15 Sep 65, 23p NAVWEPS-17-20ML-15

Descriptors: (*Telescopes, Collimators), (*Collimators, Calibration), Instruction manuals, Test methods.

The manual describes the calibration procedure for the Ernst Leitz (Wetzlar) ABCAA/GAATN (16-minute range) or AADHM/GAATN (30-minute range) coordinate autocollimator. Each instrument is an autocollimating-type telescope with a measuring eyepiece used for determining the angular displacement of reflective surfaces. The measuring eyepiece is rotatable so as to provide nonsimultaneous measurements in both the horizontal and vertical planes.

PB-169 026 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Co., Seattle, Wash. Aero-Space Div.
PYROMETER POTENTIOMETER 14 PO (LEWIS ENGINEERING).
Technical manual instrument calibration procedures, ST-04.
15 Oct 65, 11p
Contract N123 (62861)35056A
NAVWEPS 17-20ST-04

Descriptors: (*Pyrometers, Potentiometers), (*Potentiometers, Calibration), Thermocouples, Instruction manuals, Test methods.

The manual describes the calibration procedure for the Lewis Engineering 14 PO pyrometer potentiometer. It is a dual range and dual scale instrument which can be used with any two of twenty different scales, for use with any of three types of thermocouples covering temperature from -75 to 2500F.

PB-169 117 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Metrology Engineering Center, Bureau of Naval Weapons Representative, Pomona, Calif.
COMPARISON AUTOCOLLIMATOR D-600 (DAVIDSON OPTRONICS, INC.).
15 Sep 65, 16p
NAVWEPS 17-20ML-13

Descriptors: (*Collimators, Calibration), Optical instruments, Surfaces, Reflections, Measurement, Instruction manuals, Test methods.

The manual describes the calibration procedure for the Davidson Optronics Inc. D-600 comparison autocollimator. The instrument is an autocollimating-type telescope that is used in measuring the difference in angle between two reflecting plane surfaces. The instrument housing can be rotated so as to provide for non-simultaneous measurements in both azimuth and elevation planes.

15. MILITARY SCIENCES

AD-444 364 **Field 15E**
CFSTI Price: HC$4.00
TRW Space Technology Labs., Redondo Beach, Calif.
NUMERICAL ANALYSIS OF SYSTEM AVAILABILITY AND OF PARAMETER ESTIMATION METHODS.
Revised ed.,
by W. J. Howard and N. Kaufman. 1 Aug 64, 121p Rept. no. 6101-8161-TU001
Contract AF04 (694)-524
Revision of manuscript submitted Aug 63.

Descriptors: (*Reliability, Monte Carlo method), (*Inventory control, Numerical analysis), Probability, Replacement theory, Checkout procedures, Spare parts.

This document describes two problem areas concerning systems subject to periodic checkout, which were investigated with the aid of a computer. The first part (Parameter Estimation) summarizes the results of a Monte Carlo analysis to determine the feasibility and accuracy of measuring system failure rates, checkout error probabilities, and repair effectiveness from the numbers of systems passing and failing in three consecutive checkouts. The second part (Availability Analysis) describes, mainly through a series of graphs, the quantitative variation of system availability with a number of operational and maintenance parameters representing time durations of standby, checkout, and repair, failure rates during standby and checkout, repair effectiveness, decision errors during checkout, and test coverage.

AD-458 453 **Field 15C, 5A**
CFSTI Price: HC$3.00
Air Force Systems Command, Washington, D. C. System Effectiveness Div.
WEAPON SYSTEM EFFECTIVENESS INDUSTRY ADVISORY COMMITTEE (WSEIAC). TASK GROUP I. REQUIREMENTS METHODOLOGY.
Final rept., Task Group 1,
by N. L. Murray. Jan 65, 73p AFSC-TR-65-1

Descriptors: (*Weapon systems, Effectiveness), (*Management planning, Weapon systems), (*Research program administration, Weapon systems), Analysis, Instruction manuals, Reliability, Air force.

The objective of Task Group I was 'To review present procedures being used to establish system effectiveness requirements and recommend a method for arriving at requirements that are mission responsive.' Applicable documents were examined, including Department of Defense Directives and Instructions, Air Force Regulations, Manuals, Specifications, Office Instructions, etc., that might be used to establish effectiveness requirements. Detailed examination of the Specific Operational Requirement (SOR) and the companion Directorate Office Instruction (DOI) 11-7 resulted in the preparation of a proposed Air Force Manual (Appendix I). This document provides checklists, guidelines, and procedures for SOR preparation that include the significant elements of system effectiveness. A proposed Air Force Regulation (Appendix II) was developed to formalize a program of effectiveness evaluation and prediction for the system life cycle. Policy, concepts, and major command responsibilities are developed. Additional conclusions and recommendations are submitted relative to effectiveness requirements that constitute necessary steps to development of an Air Force wide system effectiveness management program. (Author)

AD-458 455 **Field 15C, 5A**
CFSTI Price: HC$4.00
Air Force Systems Command, Washington, D. C.
WEAPON SYSTEM EFFECTIVENESS INDUSTRY ADVISORY COMMITTEE (WSEIAC). VOL. II. TASK GROUP II. PREDICTION-MEASUREMENT (CONCEPTS, TASK ANALYSIS, PRINCIPLES OF MODEL CONSTRUCTION).
Final rept., Task Group 2, vol. 2,
by D. F. Barber and C. R. Knight. Jan 65, 111p AFSC TR-65-2-Vol-2

Descriptors: (*Weapon systems, Effectiveness), (*Management planning, Weapon systems), (*Research program administration, Weapon systems), Mathematical prediction, Mathematical models, Simulation, Antimissile defense systems, Tactical warfare, Defense systems, Spacecraft, Early warning systems, Air force operations, Reliability.

Concepts of system effectiveness including the three principal terms, availability, dependability, and capability, are presented. Eight specific tasks required to evaluate effectiveness during any phase of system life are presented. A mathematical routine appropriate to effectiveness model construction is described. Using the above task analysis and the model framework, a hypothetical example is presented. Results of the evaluation illustrate effectiveness analysis methods and possible alternate decisions available. Application of simulation methods to the example are discussed. The appendixes contain summaries of four typical examples of the application of effectiveness evaluation methods to various Air Force systems. An airborne avionics system, an intercontinental ballistic missile system, a long range radar surveillance system, and a spacecraft system are described. (Author)

AD-462 053 **Field 15B, 6Q**
CFSTI Price: HC$1.00
Chemical Research and Development Labs., Edgewood Arsenal, Md.
PROTECTION AFFORDED BY EXPERIMENTAL XXCC3-IMPREGNATED NAVY WORK/ COMBAT CLOTHING WORN BY MEN EXPOSED TO MUSTARD VAPOR.
Technical rept., Jun-Aug 64,
by Fred W. Oberst, Nelson P. Musselman, Clyde H.Graf, George A. Trapp, and Paul B. Dawson.
Feb 65, 22p CRDLR-3254
Proj. DA-1C622401A097,
Task 1C622401A09701
Research supported in part by Naval Supply Research and Development Facility, Bayonne, N. J.

Descriptors: (*Protective clothing, Effectiveness), (*Impregnation, Effectiveness), (*Mustard agents, Penetration), Vesicants, Wounds + injuries, Skin.

Identifiers: XXCC3 impregnant.

The effectiveness of Navy protective clothing (singlelayer type) impregnated with XXCC3 against mustard vapor (20 mg/cu m) was tested by 10 men. Two men serving as controls wore the standard Army two-layer XXCC3-treated protective clothing and were exposed with the group. When mustard vapor penetrated the Navy clothing, erythema developed at the site of penetration within 24 hr after exposure. When this occurred, the affected subject was withdrawn from further exposure tests. The men were exposed for 15 min on the first day, 30 min on the second day, and for 1 hr on each of the following 8 days. Erythema was produced on 9 of the 10 men wearing Navy clothing exposed in the cummulative Ct range of 3,306 to 10, 054 mg min/cu m, with corresponding cumulative exposure times varying between 2.75 and 8.35 hr. Considerable care in size selection and adjustment of the Navy clothing outfit on the wearers was necessary to assure the absence of gaps in protection over the forearms and around the waist. It is concluded that the experimental XXCC3-impregnated Navy work/ combat clothing can be worn by men in mustard vapor for a cummulative Ct of 7,000 mg min/cu m (total time 6 hr) without incapacitating effects. (Author)

AD-467 157 **Field 15G, 5I, 6Q**
CFSTI Prices: HC$3.00 MF$0.75
Dunlap and Associates, Inc., Darien, Conn.
DEVELOPMENT OF METHODOLOGY FOR MEASURING EFFECTS OF PERSONAL CLOTHING AND EQUIPMENT ON COMBAT EFFECTIVENESS OF INDIVIDUAL SOLDIERS. THIRD PARTIAL REPORT. PHASE II. DEVELOPMENT OF A METHODOLOGY FOR MEASURING INFANTRY PERFORMANCE IN MANEUVERABILITY,
by Alin Gruber, Jack William Dunlap, George DeNittis, Jerrell L. Sanders, and Virginia W. Perry.
Jun 65, 80p
Contract DA-19-129-QM-2068,
Proj. USATECOM-8-3-7700-01

Descriptors: (*Military personnel, Maneuverability), Performance (Human), Measurement, Performance tests, Test methods, Instrumentation, Effectiveness, Protective clothing, Human engineering, Test equipment, Warfare.

The report describes the work performed to develop a reliable method for measuring soldier performance in the essential ingredients of this task under conditions considered representative of combat conditions. A proposed test course was established as a temporary facility and tested for reliability and sensitivity to differences in clothing and equipment using USAGETA Troops. It was determined that the events comprising the tested course provided a practical and useful basis for measuring the maneuverability of individual soldiers. A modified data collection system is recommended for an integrated field course to be evaluated as the next step in the research program. (Author)

AD-467 158 **Field 15G, 5I, 6Q**
CFSTI Prices: HC$3.00 MF$0.50
Dunlap and Associates, Inc., Darien, Conn.
DEVELOPMENT OF METHODOLOGY FOR MEASURING EFFECTS OF PERSONAL CLOTHING AND EQUIPMENT ON COMBAT EFFECTIVENESS OF INDIVIDUAL SOLDIERS. FIFTH PARTIAL REPORT. PHASE II. DEVELOPMENT OF METHODOLOGY FOR MEASURING INFANTRY PERFORMANCE IN GRENADE THROWING,
by Alin Gruber, George DeNittis, Jack William Dunlap, Jerrell L. Sanders, and Virginia W. Perry.
Jun 65, 52p
Contract DA-19-129-QM-2068,
Proj. USATECOM8-3-7700-01

Descriptors: (*Military personnel, Grenades), Tactical warfare, Performance (Human), Measurement, Surface targets, Performance tests, Impact prediction, Effectiveness, Human engineering, Test methods, Instrumentation, Decoys, Protective clothing, Statistical processes, Analysis of variance, Army research, Test facilities.

A three-phase research effort is underway to develop field methodology for measuring the effects of experimental clothing and equipment on the combat effectiveness of individual infantrymen. The first partial report in this series reported work performed to identify and rank the relative importance of the physical tasks performed in combat by the individual infantryman. One of the tasks which was considered by a sample of combat veterans to be important to combat success was the ability to throw hand grenades accurately in various battle situations. This report describes the work performed to develop a reliable method for measuring performance in throwing grenades at both horizontal and vertical targets. A proposed test course was established as a temporary facility and tested for reliability and sensitivity to differences in clothing and equipment using USAGETA Troops. It was determined that the tested course provided a practical and useful basis for measuring performance in the task and a modified data collec-

tion system was recommended for inclusion in an integrated course to be evaluated as the next step in the research program. (Author)

AD-467 159 **Field 15G, 5I, 6Q**
CFSTI Prices: HC$3.00 MF$0.75
Dunlap and Associates, Inc., Darien, Conn.
DEVELOPMENT OF METHODOLOGY FOR MEASURING EFFECTS OF PERSONAL CLOTHING AND EQUIPMENT ON COMBAT EFFECTIVENESS OF INDIVIDUAL SOLDIERS. SIXTH PARTIAL REPORT. PHASE II. DEVELOPMENT OF A METHODOLOGY FOR MEASURING INFANTRY PERFORMANCE IN DIGGING HASTY FIGHTING POSITIONS,
by Alin Gruber, Jack William Dunlap, George DeNittis, Jerrell L. Sanders, and Virginia W. Perry. Jun 65, 62p
Contract DA-19-129-QM-2068,
Proj. USATECOM-8-37700-01

Descriptors: (*Military personnel, Fortifications), Performance (Human), Measurement, Human engineering, Protective clothing, Performance tests, Test methods, Instrumentation, Test equipment, Warfare, Effectiveness.

The report describes the work performed to develop a reliable method for measuring soldier performance in this task. Procedures were established for measuring performance in the task. Procedures were established for measuring performance in the excavation of a simulated foxhole and tested for reliability and sensitivity to differences in clothing and equipment using USAGETA Troops. Four possible test methods were evaluated and a modified test situation with an automatic data collection system is recommended for inclusion in an integrated field course to be evaluated as the next step in the research program. The method selected involves the prestressing of participants with three 100-yard dashes after which the times to excavate specified weights of earth are recorded. (Author)

BNL-917 **Field 15F, 6R, 6F**
CFSTI Prices: HC$3.00 MF$0.75
Brookhaven National Lab., Upton, N. Y.
ECOLOGICAL EFFECTS OF NUCLEAR WAR.
by G. M. Woodwell. Aug 65, 76p CONF-630805-1
Contract AT (30-2)-GEN-16
Prepared for presentation at Meeting of American Inst. of Biological Science (13th), Amherst, Mass.

Descriptors: (*Nuclear warfare, Ecology), (*Ecology, Radiation effects).

Patent 3,218,652 **Field 15E, 13E**
GARMENT CLOSURE.
Patent assigned to Army,
by Herman Madnick and Ralph Martone. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Clothing, Fastenings), (*Gloves, Fastenings), (*Fastenings, Clothing), Shoes, Protective clothing, Patents.

The closure is for attaching a glove to a sleeve, and storm rubbers for the feet or hoods for the head to another garment. The closure prevents the entrance of cold air, fluids, dust, or radioactive materials. Part of the glove is attached to the sleeve. The sleeve has a fixed cuff which cooperates with a tab on the glove to form the closure.

PB-169 006 **Field 15G, 5C**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
THE ECONOMIC ANALYSIS OF DEFENSE: CHOICE WITHOUT MARKETS,
by Fred S. Hoffman. 19 Dec 58, 20p P-1582
AD 224 135

Descriptors: (*Defense systems, Economics), Decision making, Military requirements, Department of Defense.

The presumption is made that at least some of the more general concepts and propositions of economic theory can be applied to military decision making. A dominant reason for limiting the applicability of economic theory to military decision making is that military decisions are made for the most part through institutions having little in common with markets. Two military situations are given wherein there is apparent violation of the operation of the law of diminishing returns. Military decisions are said to be made administratively in a partially decentralized organizational structure where today's problems have little to do with yesterday's.

16. MISSILE TECHNOLOGY

AD-466 997 **Field 16B, 14B, 4B**
CFSTI Prices: HC$1.00 MF$0.50
Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex. Environmental Sciences Directorate.
IMPACT PREDICTION OF THE AEROBEE AT WHITE SANDS MISSILE RANGE, NEW MEXICO,
by Ivan I. Layton and Marjorie McLardie Hoidale. Jun 65, 25p
Task DA-1V650212A127-02
ECOM 5002,
N65 30494

Descriptors: (*Rocket research, Impact prediction), (*Impact prediction, Sounding rockets), (*Sounding rockets, Impact prediction), Exterior ballistics, Ranges (Establishments), New Mexico.

Identifiers: Aerobee.

Patent 3,218,929 **Field 16A**
MULTITUBE LAUNCHER.
Patent assigned to Army,
by Nicholas J. La Costa and Richard G. Strickland. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Guided missile launchers, Decoys), (*Decoys, Launching), Patents.

The multitube apparatus is for launching multiple decoy packages simultaneously. The packages for antimissiles may be launched in flight. The packages act as decoys when viewed on a radarscope. The apparatus includes a breech, a cartridge assembly and tubes. The breech and cartridge assembly are cylindrical in shape. The cartridge assembly is coaxially aligned with and fixed to the upper planar wall of the breech. The tubes emanate radially from the breech.

Patent 3,218,976 **Field 16C, 19A**
MULTI-PROJECTILE WARHEAD.
Patent assigned to Navy,
by Eugene L. Nooker. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Continuous rod warheads, Configuration), (*Guided missile warheads, Configuration), Highcapacity projectiles, Rings, Time-delay fuzes, Patents.

The multiple-projectile, continuous rod warhead is so constructed that upon explosion a plurality of continuous rod projectiles are propelled toward a target along spaced, parallel paths so that the probability of one or more of them striking a vulnerable point on the target is increased. The warhead has time-delay elements to insure the projectiles are expelled to obtain the desired spacing.

PB-169 125 **Field 16D, 14D**
CFSTI Prices: HC$2.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
RELIABILITY CONTROL OF GUIDED MISSILES,
by T. S. Bills. 15 Apr 55, 35p APL/JHU-TG-245-3
Contract NOrd-7386

Descriptors: (*Guided missiles, Reliability), Guided missile components, Quality control, Corrosion, Resonance, Metallurgy, Tests, Probability, Electronic equipment, Reliability (Electronics), Graphics, Design.

The broad concepts underlying reliability control of guided missiles are briefly presented, describing such areas as: (1) mechanical design reliability; (2) electronic system reliability; (3) environmental and life appraisal evaluation; (4) reliability coordination; and (5) reliability measurements. This paper stresses the need for highly organized effort required to establish and maintain reliability control consistent with standard industrial practices. (Author)

17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

AD-264 260 **Field 17B, 9E**
CFSTI Price: HC$2.00
Arizona Univ., Tucson. Applied Research Lab.
PRE-MODULATION AND POST-MODULATION CLIPPING IN SINGLE SIDEBAND TRANSMISSION.
Final rept.,
by Leo R. Spogen, Harry N. Shaver, Harry E. Stewart, and Charles R. Hausenbaur. Dec 60, 50p
Contract DA-36-039-sc-80146,
Task 45-56-0024
USAEPG-SIG 960-86

Descriptors: (*Single sideband communication systems, Radio transmission), Radio waves, Speech transmission, Wave transmission, Modulation, Atmosphere, Scattering, Radio signals, Radiofrequency filters.

The transmitted power of a single sideband (SSB) system is governed by the peak value of the input signal to the final amplifier. Pre-modulation and post-modulation clipping reduce the peak-to-average characteristics of this input signal. The benefits are examined of pre-modulation and post-modulation clipping, the modulation process causes re-peaking resulting in a decrease in the expected improvement. Post-modulation clipping creates distortion components. Components with 0-10 db of clipping are negligible. (Author)

AD-428 509 **Field 17J**
CFSTI Price: HC$4.00
Massachusetts Inst. of Tech., Cambridge.
STUDIES IN OPTIMUM FILTERING OF SINGLE AND MULTIPLE STOCHASTIC PROCESSES,
by S. M. Simpson, E. A. Robinson, R. A. Wiggins and C. I. Wunsch. 30 Jun 63, 141p Scientific-7
Contract AF19 (604)-7378, ARPA Order-180-61,
Projs. AF-8652, VELA-UNIFORM,
Task 865203
AFCRL 64-241,
N64 15480

Descriptors: (*Filters (Electromagnetic wave), Mathematical models), Nuclear explosions, Signals, Detectors, Difference equations, Theory, Programming (Computers), Digital computers, Digital systems, Stochastic processes.

This report treats the design of discrete filters for the detection of signals caused by nuclear explosions on digitized seismic recordings. The theoretical aspects of filter design are treated, together with the setting up of the necessary formulas for realizing the filters on digital computers. Recursive computational schemes are presented for normal equations of Toeplitz form. For single processes the Levinson recursion for the extension of the prediction error operator and the extension of the general filter is developed, as well as the recursion to move the output origin. A corresponding devel-

opment is given for multi-channel processes, as well as a development of the recursion to larger operators for the multi-dimensional processes. The prediction problem for single stationary time series is reviewed and the least square and Kolmogoroff solutions given. Extension is then made to the multiple case, the least squares equations set up and the Wiener-Masani factorization described. Heuristic use is made of the Hilbert space property of time series. A digital computer program for performing the Wiener-Masani factorization is discussed. (Author)

AD-467 005 **Field 17G**
CFSTI Prices: HC$2.00 MF$0.50
Bell Helicopter Co., Fort Worth, Tex.
LEGIBILITY OF ALPHA-NUMERIC INFORMATION AS A FUNCTION OF DISPLAY ROTATION.
Rept. on JANAIR,
by J. A. Sgro, C. B. Elam and D. J. Dougherty.
Nov 64, 41p Technical rept. D228-421-502
Contract Nonr-1670 (00)

Descriptors: (*Helicopters, Ground position indicators), (*Ground position indicators, Helicopters), (*Navigation charts, Display systems), Maps, Map projection, Flight instruments, Design.

Identifiers: Alpha-numeric symbols.

The study was performed to examine the information requirements and the optimal presentation of navigation and horizontal position information. Examination of the rotary wing pilot displays emphasising the pictorial qualities has indicated the desirability of using a moving pictorial map display. Several reasons prompted this decision: (1) research indicated that for the critical maneuvering of the steep gradient vehicles at low level and slow speeds the use of a moving map was superior; (2) direct sensor information such as radar can best be superimposed on a moving map display and (3) the moving elements of a moving man display are compatible with those of the pictorial vertical display. The use of the moving map generates special problems. One of these is the requirement to read alpha-numeric information at various degrees of rotation, including inverted. This study examined the ability of Ss to read such data. Correctness of response and time to respond were the scores recorded during a presentation of the visual stimulus. The stimulus displays were world and number of various lengths taken from aeronautical charts. It was concluded that (1) the legibility of word information is most difficult when displayed in an inverted or near inverted position and (2) the legibility of numeric information does not pose a problem when displayed at any degree or rotation.

AD-468 772 **Field 17G**
CFSTI Prices: HC$3.00 MF$0.75
Dynamics Research Corp., Stoneham, Mass.
ADVANCED CELESTIAL TRACKER TECHNIQUES GIMBAL POSITION READOUT.
Technical rept.
Apr 65, 78p
Contract AF33 (657)-10893,
Proj. 4200,
Task 420002
AFAL TR-65-58
AD-468 772 includes second rept. entitled Reference Drawings.

Descriptors: (*Celestial navigation, Optical equipment), (*Celestial guidance, Optical equipment), (*Inertial guidance, Optical equipment), (*Theodolites, Navigational aids), Star trackers, Optical scanning, Photoelectric cells (Semiconductor), Servomechanisms, Analog-todigital converters, Mechanical drawings.

Identifiers: Theodosyns.

The purpose of the project was the development of an ultraprecise, optical, shaft-angle encoding system of minimum size and weight for use in star trackers, inertial platforms and guidance systems, precision servos, and other aerospace applications. Presented herein are descriptions of methods which were considered for increasing the resolution of the Theodosyn shaft-angle encoder from its basic 18 bits to 20 bits, a description of the prototype system which was built under the contract, and experimental data demonstrating the feasibility of accomplishing the stated objective using the selected technique. A prototype encoder and breadboard interpolation electronic circuits were built and tested, showing maximum rms errors of less than 0.6 arc second. These results indicate that the design concepts employed in the prototype are feasible for production of 20- or 21-bit Theodosyns using the same disc pattern and, moreover, that the same techniques could be used to produce a 20- or 21-bit absolute encoder without increasing the size of the housing.

C13.46-279 **Field 17E, 20F**
CFSTI Price: MF$0.50
National Bureau of Standards, Washington, D. C.
FLUX AVERAGING DEVICES FOR THE INFRARED,
by S. Thomas Dunn. 9 Dec 65, 44p Technical note TN-279
NASA Order-R-09-022-032
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.30.

Descriptors: (*Infrared detectors, Optical equipment components), Infrared radiation, Distribution, Infrared optical systems, Thermocouples, Infrared optical materials.

The spatial and angular sensitivity of infrared detectors recently has been investigated. In order to eliminate this effect and obtain accurate measurements in the infrared, it is necessary to distribute the flux as uniformly as possible over the entire sensitive area of the detector. A solution to this problem is presented in the form of several averaging devices developed at the National Bureau of Standards. Among the devices investigated are roughened NaCl windows, diffusing light ducts, and spheres with different coatings. Each device was subjected to a series of tests to establish its averaging capability and useful wavelength range. Results of these tests indicate that the use of a small sulfur-coated hollow sphere over the detector increased the accuracy of most types of infrared reflectance measurements and, at the same time, decreased the requirement for precise optical alignment of the detector in the wavelength range of 1.5 to 8 microns. The use of the sulfur-coated sphere over a thermopile extends the usefulness of the multiple-reflection specular reflectometer to about 10 microns. (Author)

N65-36765 **Field 17B, 22B**
CFSTI Prices: HC$5.00 MF$1.00
Stanford Univ., Calif. Stanford Electronics Labs.
A PHASE LOCKED DUAL CHANNEL SPACECRAFT RECEIVER FOR PHASE AND GROUP PATH MEASUREMENTS,
by R. L. Koehler. Nov 65, 153p
Contract NAS2-1759; Grant NsG-329
NASA CR-323

Descriptors: (*Phase-locked communication systems, Space communication systems), (*Space communication systems, Radio receivers).

N66-10325 **Field 17G, 22A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
APPLICATION OF AN ITERATIVE GUIDANCE MODE TO A LUNAR LANDING.
Technical note,
by Helmut J. Horn. Nov 65, 16p NASA-TN-D-2967

Descriptors: (*Lunar satellites, Landings), (*Guidance, Iterative methods).

Patent 3,218,909 **Field 17E**
OPTICAL RANGING DEVICE USING MOVABLE CONCENTRIC COPLANAR DETECTORS.
Patent assigned to Navy,
by Janice B. Fain. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Range finding, Infrared detectors), (*Infrared detectors, Range finding), Lenses, Equations, Patents.

The range finder is for determining the range to a target jet aircraft which emanates rays of energy. Two concentric infrared detectors are provided lying in a common plane which is normal to the optical axis of the lens, one of the detectors being circular in shape and the other being an annular ring around and isulated from the first detector. The inner detector is located along the optical axis so that as the detectors are moved along the optical axis the ratio of the outputs of the detectors indicate, upon a comparison, where the image plane of the desired object is located so that the range to the object can be determined.

PB-169 061 **Field 17G, 9E, 1D**
CFSTI Prices: HC$3.00 MF$0.75
Airborne Instruments Lab., Deer Park, N. Y.
A WAVEGUIDE GLIDE SLOPE ANTENNA.
Final rept.
Jul 65, 95p
Contract FAA/BRD-317,
Proj. FAA-320-101-01N
SRDS RD-65-46

Descriptors: (*Antenna arrays, Glide path systems), (*Glide path systems, Antenna arrays), Waveguides, Slot antennas, X band, S band, Model tests, Antenna radiation patterns, Performance (Engineering), Ultrahigh frequency.

This report describes an FAA-sponsored development and flight test program of a directional glideslope system that is fully compatible with ICAO ILS standards and conventional airborne receivers, but that does not rely upon the ground-reflected signals required by conventional glide slope systems. The theory and application to ILS of the rugged, simple, 20-wavelength, slottedwaveguide array is described in detail from its original design through X- and S-band model tests and its final full-scale fabrication to flight test at three different problem sites. (Author)

PB-169 062 **Field 17G**
CFSTI Prices: HC$3.00 MF$0.75
Texas Instruments, Inc., Dallas. Apparatus Div.
MODIFICATION OF ASR-4 RADAR INDICATOR TO PROVIDE BRIGHT DISPLAY OF RADAR, BEACON, ALPHA-NUMERIC AND SYMBOLIC DATA SP8-A65.
Final rept.,
by John F. Berglund. Mar 65, 98p
Contract FA-WA-4178,
Proj. FAA-104-5 24D
SRDS RD-65-42

Descriptors: (*Airport radar systems, Display systems), Radar beacons, Radar equipment, Storage tubes, Tracking, Digital recording systems, Modification kits, Air traffic control systems.

Identifiers: Symbols, Alpha-numeric symbols.

A five-part kit was designed and developed for field modifying Airport Surveillance Radar ASR-4 indicator subsystems. The kits are designed to provide phased implementation of (1) bright display of radar video, (2) display of a slew dot and generation of a beacon readout trigger, (3) display of asynchronous beacon or radar video, (4) display of computer-derived alpha-numeric and symbolic data, and (5) generation of digital message formats for transfer of data to a display computer. These modifications were incorporated into a two-console display subsystem which was successfully tested and installed as a part of the Advanced Radar Traffic Control System (ARTS) at the Atlanta Terminal Area Tower, Atlanta, Georgia. (Author)

PB-169 116 **Field 17G**
CFSTI Prices: HC$1.00 MF$0.50
Metrology Engineering Center, Bureau of Naval Weapons Representative, Pomona, Calif.
TACAN BEACON SIMULATOR HLI-103A (HOFFMAN ELECTRONICS CORP.).
Technical manual instrument calibration procedure GG-23.
1 Oct 65, 24p
NAVWEPS 17-20GG-23

Descriptors: (*Navigational aids, Simulators), (*Simulators, Calibration), Radio navigation, Radio equipment, Radio beacons, Instruction manuals, Test methods.

Identifiers: TACAN.

The manual describes the calibration procedure for the Hoffman Electronics Corp. HLI-103A beacon simulator. The Test Instrument generates a complete signal simulating that transmitted by a fixed TACAN navigation beacon such as the AN/URN-3, and is used to test airborne TACAN radio equipment such as the AN/URM-21 Radio Set.

18. NUCLEAR SCIENCE AND TECHNOLOGY

AD-444 557 **Field 18C, 20N**
CFSTI Price: HC$3.00
Lockheed Missiles and Space Co., Palo Alto, Calif.
SUB ELF GEOMAGNETIC FLUCTUATIONS. VOLUME III. OBSERVATIONS OF TRANSIENT AND BACKGROUND VLF, ELF AND SUB ELF ELECTROMAGNETIC EFFECTS PRODUCED BY HIGH ALTITUDE NUCLEAR DETONATIONS.
Final rept., vol. 3,
by Lee Tepley, R. C. Wentworth, Kay G. Lambert, H. V. Prentiss, and K. D. Amundsen. 26 Dec 63, 78p Rept. no. 8-08-64-1
Contract AF19 (628)-462,
Projs. AF-8653, DASA-MIPR-1106-2061-61
AFCRL 64-204 (3)

Descriptors: (*Electromagnetic waves, Nuclear explosions), (*Nuclear explosions, High altitude), Very low frequency, Extremely low frequency, Terrestrial magnetism, Transients, Electromagnetic waves, Instrumentation, Magnetic recording systems, Background, Detection, Loop antennas.

The report deals with two completely separate categories of ELF and sub ELF effects produced by high altitude nuclear detonations. In the first category are electromagnetic transients produced by the explosions. In the second category are variations in background effects resulting from bomb-produced changes in the electromagnetic environment. Part 1 discusses the operation of the Lockheed Pacific stations and the instrumentation employed for the ELF and sub ELF measurements. Part 2 presents results of geomagnetic fluctuations and electromagnetic waves produced by high-altitude nuclear detonations in the summer of 1962 series. Also presented are signals from three high-altitude tests conducted by the USSR. Part 3 considers bomb-produced variations in background electromagnetic radiation. The results of this section are limited to a single event (9 July 1962), but data is presented in a broad frequency range extending through the VLF band.

AD-451 688 **Field 18F, 13M**
CFSTI Price: HC$1.00
Naval Civil Engineering Lab., Port Hueneme, Calif.
A SIMPLE METHOD FOR CALCULATION OF GAMMARAY SHIELDING PROPERTIES OF SHELTER ENTRANCEWAYS.
Technical note, Jan-Aug 64,
by Charles M. Huddleston. 26 Oct 64, 17p N-651
Proj. Y-F008-08-05-201,
Task DASA-11.026

Descriptors: (*Fallout shelters, Shielding), (*Shielding, Numerical analysis), (*Gamma rays, Attenuation), (*Doors, Shielding), Equations, Dose rate, Ducts, Nomographs.

An empirical equation is described for calculating the attenuation factor for gamma radiation within a ducted entranceway into a shelter. Some sample problems are worked, and a discussion is given of the accuracy of the formula. (Author)

ANL-6859 **Field 18J**
CFSTI Prices: HC$4.00 MF$1.00
Argonne National Lab., Ill.
ENGINEERING DEVELOPMENT OF FLUID-BED FLUORIDE VOLATILITY PROCESSES. PART 4. FLUIDIZED-PACKED BEDS STUDIES OF HEAT TRANSFER, SOLIDS-GAS MIXING, AND ELUTRIATION.
by John D. Gabor and William J. Mecham. Mar 65, 127p
Contract W-31-109-eng-38

Descriptors: (*Reactor fuels, Transport properties), (*Thermal properties, Reactor fuels).

ANL-7057 **Field 18J, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
PREPARATION OF METALS BY MAGNESIUM-ZINC REDUCTION. PART I. REDUCTION OF URANIUM OXIDES,
by J. B. Knighton and R. K. Sieunenberg. Jun 65, 18p
Contract W-31-109-eng-38

Descriptors: (*Reduction (Chemistry), Uranium compounds), (*Uranium compounds, Reactor fuel processing).

ANL-7058 **Field 18J, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
PREPARATION OF METALS BY MAGNESIUM-ZINC REDUCTION. PART II. REDUCTION OF THORIUM DIOXIDE,
by A. V. Hariharan, J. B. Knighton, and H. K. Steunenberg. Jun 65, 17p
Contract W-31-109-eng-38

Descriptors: (*Reduction (Chemistry), Thorium compounds), (*Thorium compounds, Reactor fuel processing).

ANL-7059 **Field 18J, 7A**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
PREPARATION OF METALS BY MAGNESIUM-ZINC REDUCTION. PART III. REDUCTION OF PLUTONIUM DIOXIDE.
by J. B. Knighton and R. K. Stounenberg. Jun 65, 12p
Contract W-31-109-eng-38

Descriptors: (*Reactor fuel processing, Reduction (Chemistry)), (*Reduction (Chemistry), Plutonium compounds).

ANL-7068 **Field 18F**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
LABORATORY INVESTIGATIONS IN SUPPORT OF FLUID-BED FLUORIDE VOLATILITY PROCESSES. PART VIII. ANALYSIS OF AN ACCIDENTAL MULTIGRAM RELEASE OF PLUTONIUM HEXAFLUORIDE IN A GLOVEBOX.
by L. F. Trevorrow, R. W. Kessie, and M. J. Steindler. Jul 65, 20p
Contract W-31-109-eng-38

Descriptors: (*Reactor accidents, Plutonium compounds), (*Plutonium compounds, Fluorides).

ANL-7082 **Field 18I, 18J, 18K**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT, JULY 1965.
24 Aug 65, 82p
Contract W-31-109-eng-38

Descriptors: (*Liquid metal cooled reactors, Reactor operation), (*Reactor safety systems, Reactor kinetics).

ANL-7085 **Field 18D, 6R**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
A NEUTRON MONITOR FOR SIMULTANEOUS MEASUREMENT OF FLUENCE AND DOSE EQUIVALENT,
by Robert F. Dvorak and Norman C. Dyer. Aug 65, 12p
Contract W-31-109-eng-38

Descriptors: (*Neutron counters, Dose rate), (*Neutron flux, Neutron counters).

APDA-168 **Field 18J, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Atomic Power Development Associates, Inc., Detroit, Mich.
THE DETERMINATION OF OXYGEN IN SODIUM METAL,
by D. F. Beltz, J. O. Kermoshchuk, and S. A. Meacham. 2 Jul 65, 34p
Contract AT (11-1)-865

Descriptors: (*Deoxidation (Metallurgy), Sodium), (*Reactor materials, Deoxidation (Metallurgy)).

BMI-1731 **Field 18H, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
RADIATION STABILITY OF URANIUM MONONITRIDE,
by Robert L. Martin, William J. Zielenbach, and Victor W. Sterhek. 29 Jun 65, 31p EURAEC-1431
Contract W-7405-eng-92

Descriptors: (*Radiation damage, Uranium compounds), (*Uranium compounds, Nitrides).

BNL-9236 **Field 18D, 20H, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Brookhaven National Lab., Upton, N. Y. European Organization for Nuclear Research, Geneva, Switzerland.
ON GETTING RESULTS FROM AN HPD SYSTEM,
by P. V. C. Hough and B. W. Powell. 27 May 65, 41p CONF-650510-10
Contract AT (30-2)-GEN-16
Prepared for Presentation at Purdue Conference on Instrumentation for High Energy Physics, Lafayette, Ind.

Descriptors: (*Bubble chambers, Ionization trails), (*Computers, Bubble chambers).

BNL-939 **Field 18J, 11F**
CFSTI Prices: HC$3.00 MF$0.75
Brookhaven National Lab., Upton, N. Y.
HIGH-TEMPERATURE LIQUID-METAL TECHNOLOGY REVIEW.
Bimonthly technical progress review.
Sep 65, 75p
Contract AT (30-2)-GEN-16

Descriptors: (*Liquid metal cooled reactors, Reviews).

BNWL-C-45 **Field 18N, 18B**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PROMETHIUM ISOTOPIC POWER DATA SHEETS,
by H. H. Van Tuyl. 15 Mar 65, 8p
Contract AT (45-1)-1830

Descriptors: (*Nuclear power plants, Radioactive isotopes), (*Promethium, Radioactive isotopes).

BNWL-SA-137 **Field 18G, 7E**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
SELECTIVE AND SENSITIVE ANALYSIS OF ACTIVATION PRODUCTS BY MULTIDIMENSIONAL GAMMA RAY SPECTROMETRY,
by R. W. Perkins and D. E. Robertson. 5 Apr 65, 31p CONF-650405-5
Contract AT (45-1)-1830
Prepared for presentation at International Conference on Modern Trends in Activation Analysis, College Station, Tex.

Descriptors: (*Fission product activity, Gamma-ray spectroscopy), (*Gamma-ray spectroscopy, Fission products).

BNWL-SA-61 **Field 18K, 9B, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
A SYSTEM OF CHAINED COMPUTER CODES FOR REACTOR FUEL CYCLE ANALYSIS,
by E. A. Eschbach, D. E. Deonigi, and E. T. Merrill May 65, 38p CONF-650501-14
Contract AT (45-1)-1830
Prepared for presentation at American Nuclear Society, Conference on Application of Computing Methods to Reactor Problems Meeting, Argonne, Ill. 17-19 May 65.

Descriptors: (*Fuel burn up, Programming (Computers)), (*Programming (Computers), Reactor kinetics).

BNWL-120 **Field 18J, 11F**
CFSTI Prices: HC$4.00 MF$0.75
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
METALLURGY RESEARCH OPERATION.
Quarterly progress rept., Apr-Jun 65.
15 Jul 65, 131p
Contract AT (43-1)-1830

Descriptors: (*Reactor materials, Metallurgy), (*Radiation damage, Reactor materials).

BNWL-125 **Field 18J, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
CORROSION EVALUATION OF HIGH-SILICON ALUMINUM ALLOYS,
by H. C. Bowen. Sep 65, 23p
Contract AT (45-1)-1830

Descriptors: (*Reactor materials, Corrosion), (*Corrosion, Reactor materials).

BNWL-131-B **Field 18J, 18I**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
FABRICATION COSTS FOR PLUTONIUM FUEL ELEMENTS. PART B. VARIABLE COSTS OF FABRICATING U02-PU02 FUEL RODS FOR THE EXPERIMENTAL BOILING WATER REACTOR,
by C. H. Bloomster. Sep 65, 28p
Contract AT (45-1)-1830

Descriptors: (*Reactor fuel elements, Costs), (*Boiling water reactors, Plutonium).

CONF-65-602-26 **Field 18K**
CFSTI Prices: HC$1.00 MF$0.50
Knolls Atomic Power Lab., Schenectady, N. Y.
INTEGRAL MEASUREMENTS OF ALPHA FOR U-235 IN THE EPITHERMAL REGION,
by L. J. Esch. 1965, 12p
Contract W-31-109-eng-52
Prepared for presentation at American Nuclear Society Annual Meeting (11th), Gatlinburg, Tenn.

Descriptors: (*Neutron transport theory, Uranium).

DP-943 **Field 18J, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont de Nemours (E.I.) and Co., Aiken, S. C. Savannah River Lab.
THORIUM-1.4 PERCENT 235 U METAL FUEL TUBES FABRICATION AND IRRADIATION IN HWCTR,
ed. by Stephen R. Nemeth. Jul 65, 30p
Contract AT (07-2)-1

Descriptors: (*Reactor fuel elements, Thorium), (*Thorium, Heavy water reactors).

DP-968 **Field 18I, 18K**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
LEAK TESTING OF THE HWCTR CONTAINMENT BUILDING,
by S. H. Kale, T. C. Gorrell and E. O. Kiger. Oct 65, 40p
Contract AT (07-2)-1

Descriptors: (*Containment, Test methods), (*Heavy water reactors, Containment).

DP-973 **Field 18J, 7E, 18I**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
DEPLETION OF DEIONIZER RESIN IN AN SRP REACTOR SYSTEM,
by Elizabeth W. Haumann. Aug 65, 14p
Contract AT (07-2)-1

Descriptors: (*Ion exchange resins, Power reactors), (*Power reactors, Reactor moderators).

DP-974 **Field 18N, 18B**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont de Nemours (E.I.) and Co., Aiken, S. C. Savannah River Lab.
60 CO HEAT SOURCES FOR 10-60 KW (E) GENERATORS,
by Arthur H. Dexter. Jul 65, 10p
Contract AT (07-2)-1

Descriptors: (*Nuclear power plants, Radioactive isotopes), (*Radioactive isotopes, Cobalt).

DP-975 **Field 18L, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont de Nemours (E.I.) and Co., Aiken, S. C. Savannah River Lab.
HEAVY WATER MODERATED POWER REACTORS.
Progress rept., Mar-Jun 65,
by R. R. Hood and D. F. Babcock. Aug 65, 26p
Contract AT (07-2)-1

Descriptors: (*Power reactors, Reactor fuels), (*Heavy water reactors, Power reactors).

DP-979 **Field 18B, 7E**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
PROCESS SCALE SEPARATION OF HYDROGEN ISOTOPES BY GAS CHROMATOGRAPHY,
by David L. West. Oct 65, 24p
Contract AT (07-2)-1

Descriptors: (*Isotope separation, Gas chromatography), (*Gas chromatography, Hydrogen).

DP-989 **Field 18J, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
URANIUM DIOXIDE FUEL TUBES FOR IRRADIATION IN THE VBWR,
by Anthony S. Ferrara. Oct 65, 25p
Contract AT (07-2)-1

Descriptors: (*Reactor fuel elements, Uranium compounds), (*Boiling water reactors, Reactor fuel elements).

GA-4901 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
General Atomic, San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
RESEARCH ON GRAPHITE.
Quarterly progress rept. for period ending 31 Dec 63,
by R. J. Price and J. L. White. 16 Mar 64, 46p
Contract AT (04-3)-167

Descriptors: (*Graphite, Microstructure), (*Recrystallization, Graphite).

GA-6163 **Field 18J, 11F**
CFSTI Prices: HC$2.00 MF$0.50
General Atomic, San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
A PROGRAM OF BASIC RESEARCH ON MECHANICAL PROPERTIES OF REACTOR MATERIALS.
Quarterly progress rept. for period ending 31 Jan 65,
by J. C. Appel, R. H. Chambers, and T. A. Trozera. 25 Feb 65, 28p
Contract AT (04-3)-167

Descriptors: (*Reactor materials, Mechanical properties), (*Tungsten, Single crystals).

GAMD-4814 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
General Atomic, San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
GAS TRANSPORT PROPERTIES AND PORE STRUCTURE OF SOME NUCLEAR GRAPHITES,
by A. Riedinger. 25 Jun 64, 36p
Contract AT (04-3)-167,
Proj. 317.2131

Descriptors: (*Graphite, Reactor materials), (*Gases, Transport properties).

GEAP-4445 **Field 18J, 13K**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
A SURVEY OF WATER REACTOR PRIMARY SYSTEM CONDITIONS PERTINENT TO THE STUDY OF PIPE RUPTURE,
by E. R. Kilsby, Jr. Jan 64, 108p
Contract AT (04-3)-189

Descriptors: (*Reactor system components, Pipes), (*Pipes, Rupture).

GEAP-4780 **Field 18K**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
EVESR TRANSIENT MODEL,
by D. C. Maxwell. 1 Feb 65, 65p
Contract AT (04-3)-189

Descriptors: (*Light water reactors, Mathematical models), (*Reactor kinetics, Light water reactors).

GEMP-51A **Field 18J, 11F**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
HIGH-TEMPERATURE MATERIALS PROGRAM.
Progress rept no. 51, Pt. A.
30 Sep 65, 59p
Contract AT (40-1)-2847

Descriptors: (*Reactor materials, High-temperature research).

GEMP-52A **Field 18J, 11F**
CFSTI Prices: HC$3.00 MF$0.50
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
HIGH-TEMPERATURE MATERIALS PROGRAM PROGRESS REPORT NO. 52, PART A.
20 Oct 65, 51p
Contract AT (40-1)-2847

Descriptors: (*Reactor materials, Heat-resistant metals + alloys), (*Heat-resistant metals + alloys, High-temperature research).

HW-SA-3379 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
NEW EMISSIVITY INDEPENDENT INFRARED THERMAL METHOD FOR NONDESTRUCTIVE TESTING,
by Donald R. Green. 20 Feb 64, 27p
Contract AT (45-1)-1350

Descriptors: (*Reactor fuel elements, Infrared radiation), (*Non-destructive testing, Infrared detectors).

HW-SA-3510 **Field 18J, 13H, 13E**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
ESSENTIALS OF QUALITY CONTROL FOR PRODUCTION OF NUCLEAR WELDMENTS,
by E. B. Lavelle and D. L. Hovorka. 1964, 13p
Contract AT (45-1)-1350

Descriptors: (*Reactor materials, Welding), (*Welds, Quality control).

HW-84106 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
THE TECHNOLOGY OF THORIA AND THORIA-URANIA COMPOSITIONS. (A REVIEW OF THE LITERATURE),
by T. W. Evans. 18 Sep 64, 40p
Contract AT (45-1)-1350

Descriptors: (*Reactor fuels, Thorium), (*Uranium, Reactor fuels).

IDO-17075 **Field 18K, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Phillips Petroleum Co. Idaho Falls, Idaho. Atomic Energy Div.
CEP. A MONTE CARLO PROGRAM FOR THE CALCULATION OF FIRST-FLIGHT ESCAPE PROBABILITIES FOR FINITE CYLINDERS,
by W. K. Foell, C. W. Berner, and S. Tong. Sep 65, 21p
Contract AT (10-1)-205

Descriptors: (*Resonance escape probability, Monte Carlo method), (*Programming (Computers), Neutron transport theory).

IDO-17109 **Field 18I, 18K**
CFSTI Prices: HC$4.00 MF$1.00
Phillips Petroleum Co. Idaho Falls, Idaho. Atomic Energy Div.
AN ANALYSIS OF THE EXCURSION BEHAVIOR OF A HIGHLY ENRICHED PLATE-TYPE D20-MODERATED CORE IN SPERT II,
by R. L. Johnson, H. A. Larson, and J. A. McClure. Sep 65, 132p
Contract AT (10-1)-205

Descriptors: (*Reactor reactivity, Enriched fuel reactors), (*Heavy water reactors, Reactor kinetics).

IDO-28649 **Field 18I, 18J**
CFSTI Prices: HC$4.00 MF$0.75
Aerojet-General Nucleonics, San Ramon, Calif.
ARMY GAS-COOLED REACTOR SYSTEMS PROGRAM.
Quarterly progress rept. 1 Apr-30 Jun 65.
13 Aug 65, 106p
Contract AT (10-1)-880

Descriptors: (*Gas-cooled reactors, Mobile).

KAPL-M-6455 **Field 18K, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Knolls Atomic Power Lab., Schenectady, N. Y.
CALCULATION OF THE BUILDUP OF CADMIUM DUE TO THE NEUTRON IRRADIATION OF SILVER,
by Dario Bollacasa and D. T. Goldman. 15 Feb 65, 13p
Contract W-31-109-eng-52

Descriptors: (*Fission products, Cadmium), (*Silver, Radioactive decay).

LA-DC-7017 **Field 18L**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
KIWI TNT -- EVALUATION OF ENVIRONMENTAL EFFECTS.
by Harry S. Jordan, Robert V. Fultyn, Richard W. Henderson, and Philip K. Lee. 1965, 3p
CONF-650602-20
Contract W-7405-eng-36
Presented at American Nuclear Society Annual Meeting (11th), Gatlinburg, Tenn.

Descriptors: (*Spacecraft nuclear propulsion, Environmental tests).

LA-3357 **Field 18J, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
PROCESSING OF PLUTONIUM BY ION EXCHANGE. VII. PLUTONIUM (IV) DESORPTION KINETICS FROM DOWEX 1 X 4 INTO NITRIC ACID SOLUTIONS,
by D. B. James. 14 Jun 65, 20p
Contract W-7405-eng-36

Descriptors: (*Reactor fuel processing, Plutonium), (*Ion exchange, Plutonium).

LA-3370 **Field 18I, 20I**
CFSTI Prices: HC$3.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
ADVANCED REACTOR TECHNOLOGY (ART).
Quarterly status rept. for 31 Jul 65.
Aug 65, 61p
Contract W-7405-eng-36

Descriptors: (*Power reactors, Reactor fuel elements), (*Magnetohydrodynamics, Power reactors).

LA-3385 **Field 18K**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
NEUTRON BLANKET CALCULATIONS FOR THERMONUCLEAR REACTORS,
by George I. Bell. 30 Aug 65, 13p
Contract W-7405-eng-26

Descriptors: (*Thermal reactors, Neutron transport theory), (*Neutron transport theory, Thermal reactors).

MLM-1275 **Field 18H, 6R**
CFSTI Prices: HC$1.00 MF$0.50
Mound Lab., Miamisburg, Ohio.
ENVIRONMENTAL MONITORING REPORT JANUARY-JUNE 1965,
by P. C. Adams. 16 Jul 65, 15p
Contract AT-33-1-GEN-53

Descriptors: (*Radioactivity, Environment), (*Radiation monitors, Radioactive isotopes).

MND-3169-68 **Field 18N, 22B**
CFSTI Prices: HC$3.00 MF$0.75
Martin Co., Baltimore, Md. Nuclear Div.
NIMBUS DYNAMICS ANALYSIS FOR EJECTION MECHANISM,
by R. G. Burglo and M. C. Miller. Jun 65, 62p
Contract AT (30-1)-2345

Descriptors: (*Nuclear power plants, Satellites (Artificial)), (*Ejection, Nuclear power plants).

N66-10334 **Field 18K, 18N**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
CRITICAL MASS STUDIES WITH NASA ZERO POWER REACTOR II. I-CLEAN HOMOGENEOUS CONFIGURATIONS.
Technical note,
by Thomas A. Fox, Robert A. Mueller, C. HubbardFord, and Donald L. Alger. Nov 65, 19p
NASA-TN-D-3097

Descriptors: (*Power reactors, Reactor fuel enrichment), (*Reactor fuel enrichment, Reactor lattice parameters).

NAA-SR-MEMO-10971 **Field 18L, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
CHARACTERISTICS OF THE 200 MWE PROTOTYPE MODULAR STEAM GENERATOR COMPLEX,
by D. Logan. 6 Jan 65, 83p
Contract AT-11-1-GEN-8

Descriptors: (*Steam power plants, Power reactors), (*Power reactors, Simulation).

NAA-SR-MEMO-10994 **Field 18L**
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
SCTI--MODULAR STEAM GENERATOR CONTROL SYSTEM STUDY,
by D. F. Casey, H. H. Cappel and C. H. Bridges. 4 Feb 65, 67p
Contract AT-11-1-GEN-8

Descriptors: (*Steam power plants, Control systems), (*Power reactors, Steam power plants).

NAA-SR-10738 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
OXIDATION-REDUCTION REPROCESSING OF URANIUM CARBIDE REACTOR FUEL. II. BEHAVIOR OF PLUTONIUM AND FISSION PRODUCTS,
by W. G. Smiley. 15 Jun 65, 34p
Contract AT (11-1)-GEN-8
See also NAA-SR-6976.

Descriptors: (*Reactor fuel processing, Oxidation-reduction reactions).

NAA-SR-10751 **Field 18J**
CFSTI Prices: HC$3.00 MF$0.75
Atomics Internationa, Canoga Park, Calif.
CARBIDE FUELS IN FAST REACTORS,
by C. W. Wheelock. 15 Sep 65, 78p
Contract AT (11-1)-GEN-8

Descriptors: (*Reactors fuels, Fast reactors), (*Carbides, Reactor fuels).

NAA-SR-11207 **Field 18N, 22A**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
MAGNETIC MOMENTS AND VEHICLE TORQUES IN THE SNAP 10A,
by T. J. Boyle and R. M. Galantine. 1 Oct 65, 50p
Contract AT (11-1)-GEN-8

Descriptors: (*Nuclear power plants, Spacecraft), (*Spacecraft, Torque).

NAA-SR-9908 **Field 18N, 11C**
CFSTI Prices: HC$1.75 MF$0.75
Atomics International, Canoga Park, Calif.
THE DEVELOPMENT AND QUALIFICATION OF THERMAL CONTROL COATINGS FOR SNAP SYSTEMS,
by J. R. Crosby. 30 Sep 65, 69p
Contract AT (11-1)-GEN-8

Descriptors: (*Nuclear power plants, Spacecraft), (*Coatings, Thermal properties).

NLCO-965 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
National Lead Co., Cincinnati, Ohio.
SUMMARY TECHNICAL REPORT FOR THE PERIOD JULY 1-SEPTEMBER 30, 1965,
ed. by R. Burgett. 20 Oct 65, 39p
Contract AT (30-1)-1156

Descriptors: (*Reactor fuel processing, Uranium).

NMI-4996 **Field 18J, 11F**
CFSTI Prices: HC$5.00 MF$1.00
Nuclear Metals, Inc., West Concord, Mass.
TECHNICAL PAPERS OF THE METALLOGRAPHIC GROUP MEETING (14th), HELD APRIL 5-6, 1960 AT NUCLEAR METALS, INC., WEST CONCORD, MASSACHUSETTS,
by H. P. Roth. 6 Jan 64, 176p CONF-600401
Contract AT (30-1)-1565

Descriptors: (*Reactor materials, Metals).

NMI-4998 **Field 18J, 11F**
CFSTI Prices: HC$4.00 MF$0.75
Nuclear Metals, West Concord, Mass.
TECHNICAL PAPERS OF THE METALLOGRAPHIC GROUP MEETING (16th), HELD MARCH 28-29, 1962 AT HANFORD ATOMIC PRODUCTS OPERATION, RICHLAND, WASHINGTON,
by H. Roth Roman. 31 Aug 64, 126p CONF-620301
Contract AT (30-1)-1565

Descriptors: (*Reactor materials, Metals).

NMI-4999 **Field 18J, 11F**
CFSTI Prices: HC$5.00 MF$1.00
Nuclear Metals, Div. Textron, Inc., West Concord, Mass.
TECHNICAL PAPERS OF THE METALLOGRAPHIC GROUP MEETING (17th) HELD MAY 21-23, 1963 AT LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO,
by H. Roth Roman. 1 Apr 65, 160p CONF-105
Contract AT (30-1)-1565

Descriptors: (*Reactor materials, Metallography), (*Metallography, Reactor fuel elements).

NUMEC-3432-9 **Field 18J**
CFSTI Prices: HC$1.00 MF$0.50
Nuclear Materials and Equipment Corp., Apollo, Pa.
IRRADIATION TESTING OF UO2-PuO2 FUELS.
Quarterly progress rept. Jan 1-Mar 31, 65,
by William J. Ross, Ivor D. Thomas, and Karl H. Puechl. 1965, 8p
Contract AT (30-1)-3432

Descriptors: (*Reactor fuel elements, Uranium compounds), (*Plutonium compounds, Reactor fuel elements.)

ORNL-P-1265 **Field 18F, 18G**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
BEHAVIOR OF IODINE IN THE NUCLEAR SAFETY PILOT PLANT MODEL CONTAINMENT VESSEL,
by L. F. Parsly, L. F. Franzen, and P. P. Holz. 1964, 23p CONF-550407-5
Contract W-7405-eng-26
Prepared for presentation at International Symposium on Fission Product Release and Transport Under Accident Conditions, Oak Ridge, Tenn.

Descriptors: (*Containment, Reactor safety systems), (*Iodine, Containment).

ORNL-P-1324 **Field 18F, 18G**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
BEHAVIOR OF RADIOIODINE IN THE CONTAINMENT MOCKUP FACILITY,
by G. W. Parker, W. J. Martin and G. E. Creek. 1965, 29p CONF-650407-6
Contract W-7405-eng-26
Prepared for presentation at International Symposium on Fission Product Release and Transport Under Accident Conditions, Oak Ridge, Tenn.

Descriptors: (*Containment, Fission products), (*Iodine, Containment.

ORNL-P-874 **Field 18K, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
EXPERIENCE WITH UNUSUAL TECHNIQUES USED IN ORNL DEPLETION CODES,
by D. R. Vondy. 1965, 3p CONF-650501-2
Contract W-7405-eng-26
Presented at The Application of Computing Methods to Reactor Problems, Argonne, Ill.

Descriptors: (*Fuel burn up, Programming (Computers)), (*Programming (Computers), Critical assemblies).

ORNL-3829 **Field 18B**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
REVIEW OF ISOTOPES TARGET PROGRAM, OCTOBER 1963-DECEMBER 1964,
by E. H. Kobiak. Sep 65, 40p
Contract W-7405-eng-36

Descriptors: (*Radioactive isotopes, Preparation).

ORNL-3847 **Field 18J, 11F, 7B**
CFSTI Prices: HC$3.00 MF$0.75
Oak Ridge National Lab., Tenn.
TRANSURANIUM QUARTERLY PROGRESS REPORT FOR PERIOD ENDING NOVEMBER 30, 1964,
by W. D. Burch. Sep 65, 60p
Contract W-7405-eng-26

Descriptors: (*Transuranium elements, Radioactivity), (*Curium, Recovery).

ORNL-3859 **Field 18N, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
SNAP-8 CORROSION PROGRAM.
Quarterly progress rept. May 31, 1965,
by H. W. Savage, E. L. Compere, and R. E. MacPherson.
Contract W-7405-eng-26

Descriptors: (*Nuclear power plants, Spacecraft), (*Corrosion, Reactor materials).

Patent 3, 218,997 **Field 18G**
RADIOACTIVE WASTE MATERIAL INCINERATOR.
Patent assigned to Army,
by Christian F. Berghout, Maxwell Dauer, Francis W. Lanard, Ramon P. Minx and Walter E. Senoski.
23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Radioactive waste, Disposal), Incinerators, Patents.

The incinerator is for the disposal of combustible radioactive waste material. The structure prevents the release of hazardous amounts of radionuclides into the environment. The structure includes a closed system silo-type combustion chamber for the mass burning of combustible radioactive material, having a refractory, iron shaking grates, and two fuel injection burners; a charging chute; a concrete hood; a discharge chute surrounded by a steel water jacket; a dynamic precipitator with discharge hopper; a filter container; and a stack.

Patent 3,217,165 **Field 18D, 14B**
RADIOACTIVE REFERENCE SOURCE AND METHOD FOR MAKING THE SAME.
Patent assigned to Navy,
by Charles Christianson and Ralph C. Maggio.
9 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Beta particles, Standards), Radioactive isotopes, Calibration, Patents.

The beta radioactivity reference source is made by supporting a thin flat absorbent pad horizontally, saturating the pad with a known quantity of a predetermined percent solution of a material of known beta activity by deposition gradually one-by-one of approximately evenly distributed droplets of the solution on the upper surface of the horizontally supported pad, and air drying the pad.

PB-168 776 **Field 18J, 7D**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-AuxRoses (France). Centre d'Etudes Nucleaires.
VOLTAMMETRIE DU CHLORURE D'URANYL DANS L'EUTECTIQUE LiCl - KCl (VOLTAMMETRY OF URANYL CHLORIDE IN THE LiCl - KCl EUTECTIC),

by Jean-Claude Fondanaiche. Oct 65, 62p CEA-R-2879
Text in French; Attached Summary in English.

Descriptors: (*Reactor fuel processing, Electrochemistry), (*Electrochemistry, Uranyl radicals), Eutectics, Chemical analysis, Chlorides, Uranium compounds, Plutonium compounds, France.

Spent UO2 - PuO2 fuels can be reprocessed in a molten salt media. Uranium dioxide can easily be dissolved as UO2 Cl2 in a molten salt bath using chlorine gas. A study of quantitative analysis of an uranyl chloride solution in the LiCl-KCl eutectic at 400C has been performed here using voltammetry (a large area graphite indicator electrode has been employed). The precision which is obtained is around 6 per cent for concentrations below 0.01 M. Precision decreases slightly for more concentrated solutions. The study of polarization curves allowed to give a reduction mechanism for the UO2 (++) ion. For dilute solutions, this reduction proceeds through the UO2 (+) ion. But interpretation of current-potential curves is made difficult by the dismutation reaction of the UO2 (+) ion and by the fact that the surface of the indicator electrode is not renewed. (Author)

PB-168 932 **Field 18D**
CFSTI Prices: HC$4.00 MF$1.00
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
DETECTION DES FRAGMENTS DE FISSION PAR EMISSION SECONDAIRE (Detection of Fission Fragments by Secondary Emission),
by Arlette Audias. Oct 65, 138p CEA-R-2862
Text in French; Attached Summary in English.

Descriptors: (*Radiation measurement systems, Fission products), (*Secondary emission, Radiation measurement systems), Photomultipliers, Scintillation counters, France.

This fission fragment detecting apparatus is based on the principle that fragments traversing a thin foil will cause emission of secondary electrons. These electrons are then accelerated (10 kV) and directly detected by means of a plastic scintillator and associated photomultiplier. Some of the advantages of such a detector are, its rapidity, its discriminating power between alpha particles and fission fragments, its small energy loss in detecting the fragments and the relatively great amount of fissionable material which it can contain. (Author)

PB-168 934 **Field 18K, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
LA COLLISION ANISOTROPE DANS LES PROBLEMS DE CELLULE (The Anisotropic Collision in Cell Problems),
by Pierre Benoist. Nov 65, 19p CEA-R-2890
Text in French; Attached Summary in English.

Descriptors: (*Neutron transport theory, Reactor materials), Reactor kinetics, Thermal utilization, Fast fission factor, Reactor fuel rods, Reactor moderators, France.

A general expression allowing the calculation of the influence on cell factors of an anisotropic component of the scattering law in a given medium is established, in the framework of the integral transport theory. This expression is applied to the problems of the thermal utilization factor, fast fission factor and diffusion coefficients. In the case of the thermal utilization factor, it is shown that the introduction of the transport crosssection is justified rigorously in the moderator. In the fuel, it is not very much theoretically justified although it leads to good results for rather big rods; a very simple formula is then established from the general expression, allowing the calculation of the correction to effect on f, without using the transport cross-section; this formula leads, for all the rod diameters considered, to results in very good agreement with reference values obtained by the S8 method. An analogous formula for the fast fission factor is established. (Author)

PNE-1000 **Field 18C, 8I**
CFSTI Prices: HC$1.00 MF$0.75
El Paso Natural Gas Co., Tex. San Francisco Operations Office (AEC), Calif. Bureau of Mines, Bartlesville, Okla. Bartlesville Petroleum Research.
PROJECT GASBUGGY.
14 May 65, 61p

Descriptors: (*Nuclear explosions, Mining engineering), (*Petroleum, Mining engineering).

PNE-1999 **Field 18C, 8H**
CFSTI Prices: HC$1.00 MF$0.50
Army Engineer Nuclear Cratering Group, Livermore, Calif.
ISTHMIAN CANAL STUDIES, 1964. ANNEX III. CONSTRUCTION OF AN ISTHMIAM SEA LEVEL CANAL BY NUCLEAR METHODS, 1964.
Sep 64, 22p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, Civil engineering), (*Inland waterways, Construction).

PNE-2005 **Field 18C, 8H**
CFSTI Prices: HC$1.00 MF$0.75
Panama Canal Co., Balboa Heights (Canal Zone).
ISTHMIAN CANAL STUDIES, 1965. ANNEX III. APPENDIX 2. GENERAL CONSTRUCTION PLAN.
Sep 65, 77p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, Civil engineering), (*Inland waterways, Construction).

PNE-2006 **Field 18C, 8H**
CFSTI Prices: HC$1.00 MF$0.50
Panama Canal Co., Balboa Heights (Canal Zone).
ISTHMIAN CANAL STUDIES, 1964. ANNEX III. APPENDIX 2, INCLOSURE A. ON SITE SURVEY PROGRAM.
Sep 64, 28p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, Civil engineering), (*Inland waterways, Construction).

PNE-505P. **Field 18C, 8G**
CFSTI Prices: HC$1.00 MF$1.00
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
PRESHOT INVESTIGATIONS FOR PROJECT PRE- SCHOONER, BUCKBOARD MESA, NEVADA TEST SITE. PROJECT PRE-SCHOONER,
by R. C. Nugent and D. C. Banks. Sep 65, 144p

Descriptors: (*Nuclear explosions, Civil engineering), (*Structural geology, Nuclear explosions).

RFP-551 **Field 18J, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
RECOVERY OF PLUTONIUM FROM MISCELLANEOUS ANALYTICAL LABORATORY WASTES,
by C. F. Molen. 24 Sep 65, 28p
Contract AT (29-1)-1106

Descriptors: (*Reactor fuel processing, Radioactive wastes), (*Plutonium, Recovery).

UCRL-14249 **Field 18H**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of Califorgia, Livermore.
NEUTRON ACTIVATION OF THE TERRESTRIAL ENVIRONMENT AS A RESULT OF UNDERGROUND NUCLEAR EXPLOSIONS,
by Yook C. Ng. 22 Jun 65, 41p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, Underground), (*Neutron activation, Earth).

UCRL-14274 **Field 18J, 18L, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
VAPORIZATION OF ADVANCED POWER-PLANT METALS UNDER VACUUM AND FORCED CONVECTION CONDITIONS,
by G. E. Zima. 24 Jun 65, 25p
Contract W-7405-eng-46

Descriptors: (*Metals, Vaporization), (*Reactor materials, Nuclear power plants).

19. ORDNANCE

AD-467 744 **Field 19D, 14B**
CFSTI Prices: HC$2.00 MF$0.50
Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
PRELIMINARY INVESTIGATION OF A BLAST LOAD GENERATOR,
by August G. Edwards and Edward Lee. Aug 65, 28p Technical memo. TM-1523

Descriptors: (*Blast, Production), (*Loading (Mechanics), Simulation), Burning rate, Nuclear explosions, Underground structures, Pressure, Analog systems, Propellants, Shock waves.

The blast load generator is under development. It will be used to simulate blast loading for experimental effects studies. Propellant burning inside cylindrical perforated tubes is used to pressurize the blast load generator. The operation was simulated in order to arrive at the correct propellant charge for generation of given required pressures. Results obtained with a preliminary analog simulation setup gave an approximate picture of the blast load generator. It was established that the overpressure can be controlled by the vent area, the amount of propellant, and the propellant web. However, since the analog setup is still in its initial stages, several important items must be determined before accurate design of the charge can be undertaken. For example, the thermal coefficients and the effective surface area for heat transfer must be determined. Hence, the results can be seen only as approximations and should be used only to indicate trends and guide future tests. (Author)

Patent 3, 218,930 **Field 19G, 13J**
GUN MOUNT WITH AMMUNITION SUPPLYING MEANS.
Patent assigned to Navy,
by Philias H. Girouard, Carl V. Hickman, Garold A. Kane,John I. Nelson and Milton C. Neuman.
23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Gun mounts, Ships), (*Ammunition, Feed mechanisms), Hoists, Patents.

The mount is for a major caliber gun with calibers of five inches or more. The mount is primarily for use on a ship. Apparatus is disclosed for supplying ammunition to the gun including a series of cooperating mechanisms which move the round from the magazine deck to the gun. The mechanisms are hydraulically and electrically operated and controlled. The apparatus includes a lower hoist, a rotatable carrier, an upper hoist, a swinging cradle and a transfer tray.

Patent 3,216,272 **Field 19F**
ADJUSTABLE BACKLASH SYSTEM.
Patent assigned to Army,
by Anthony J. Suchocki. 9 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Gun mounts, Jacks (Mechanics)), (*Jacks (Mechanics), Gun mounts), Drives, Gears, Stabilization, Machine guns, Patents.

The elevating jack is associated with a machine gun mounted on a military vehicle. The jack is utilized to train the gun on a target and to stabilize it when being fired. A vernier adjustment is incorporated in the jack to compensate for manufacturing tolerances between the threads of the elevating nut and the elevating gear.

Patent 3,218,907 **Field 19A**
FELTING PROCESS FOR MAKING COMBUSTIBLE CARTRIDGE CASES.
Patent assigned to Army,
by Keith F. Beal and Erik R. Nielsen. 23 Nov 65

Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Cartridge cases, Manufacturing methods), Nitrocellulose, Cellulose, Fibers, Material forming, Dies, Patents.

A cartridge case is made by making up an aqueous slurry of cellulosic fibers, forming the fibers into a mat and molding the mat or preform into final shape by use of a die at up to 165 degrees F.

Patent 3,218,927 **Field 19A**
HATCH REMOVER.
Patent assigned to Army,
by Albert M. Stott. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Cartridges (PAD), Explosive actuators), Explosive actuators, Patents.

The hatch remover utilizes a two-tube construction in combination with a multi-purpose element for storing propellant, locking the device prior to firing, and for effecting a seal subsequent to firing. The two-tube construction yields the output of comparable three-tube devices.

Patent 3,218,928 **Field 19E, 17G**
LOFT-BOMBING SYSTEM.
Patent assigned to Navy,
by Pliny G. Holt and Louis S. Guarino. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Bombing, Navigational aids), (*Navigational aids, Bombing), Navigation computers, Navigation charts, Maps, Motion, Ground speed, Patents.

The apparatus is for loft-bombing a selected target from an aircraft flying at any ground track and speed within a predetermined geographical approach corridor. A navigational aid to the pilot is provided in which the instantaneous position of the aircraft is displayed in the cockpit by a cursor and a map, each moving in proportion to a computed ground speed and in which synchronization of cursor and map motion can be corrected at preselected ground check points having correspinding marks on the map.

PB-168 674 **Field 19G, 21I**
CFSTI Prices: HC$1.00 MF$0.50
Naval Propellant Plant, Indian Head, Md.
INSTANTANEOUS HEAT TRANSFER, PRESSURE, AND SURFACE TEMPERATURE CHARACTERISTICS OF SOLID PROPELLANT ROCKET IGNITERS.
Technical memo. rept.,
by J. Nanigian, N. J. Crookston, Jr., andA. Michelson. 12 Apr 60, 22p TMR-178
AD 238 917

Descriptors: (*Rocket igniters, Thermodynamics), Solid rocket propellants, Ignition, Failure (Mechanics), Heat transfer, Pressure, Surface properties, Thermal properties, Temperature.

Equipment was designed to measure both instantaneous heat transfer and pressure characteristics of solid propellant rocket igniters. Results indicate that evaluation of igniters solely on the basis of pressure produced is not valid since igniters differing as much as 150% in total pressure output differed less than 30% in terms of total heat transfer. (Author)

PB-168 988 **Field 19D, 8K**
CFSTI Prices: HC$1.00 MF$0.50
Coast and Geodetic Survey, Rockville, Md.
A STUDY OF THE LONG PERIOD MOTIONS OBSERVED AT HATTIESBURG AND COLUMBIA, MISSISSIPPI, FROM EVENT SALMON,
by Thomas R. Shugart. May 65, 15p

Descriptors: (*Nuclear explosions, Explosion effects), (*Seismic waves, Analysis), Seismographs, Mississippi, Instrumentation, Motion, Seismological stations, Acceleration.

Identifiers: Salmon event.

The U.S. Coast and Geodetic Survey recorded ground vibrations from Event SALMON at the AEC Warehouse in Hattiesburg, Mississippi, and at the National Guard Armory in Columbia, Mississippi. The instruments used were C and GS Vibration Meters. The radial and transverse horizontal components of motion were recorded at both stations. The purpose of the report is to describe and to attempt to explain certain anomalous features of the seismograms from these stations.

P-168 995 **Field 19D, 8K**
CFSTI Prices: HC$3.00 MF$0.75
Coast and Geodetic Survey, Rockville, Md.
EARTH VIBRATIONS FROM A NUCLEAR EXPLOSION IN A SALT DOME SALMON EVENT,
by W. V. Mickey, L. M. Lowrie and T. R. Shugart. Apr 65, 93p

Descriptors: (*Nuclear explosions, Explosion effects), (*Vibration, Earth), (*Seismic waves, Propagation), Rock salt, Motion, Mississippi, Acceleration, Seismological stations, Particles, Velocity.

Identifiers: Salmon event.

Recorded earth particle motions in terms of displacements, velocities, and accelerations were near predictions in the distance range of 1.5 to 603 km for the 5 kt SALMON nuclear detonation in a Mississippi salt dome. Scaled earth motions from HE detonations of 500 to 4000 lbs in the unconsolidated shallow sediments were consistently higher than the motions recorded from SALMON. Asymmetric seismic energy propagation was observed with more efficient propagation to the north and south. Apparent velocities of the first arrivals were: 1.458 to 6 km from ground zero, east 2.82 km/sec, south 2.67 km/sec; 6 to 100 km, 4.77 km/sec; and 100 to 603 km southwest, 8.5 km/sec. The maximum motions were propagated at near 1.9 km/sec. The horizontal resultant vector for first motion was anomalous for three stations with deviations from a radial path of 36.2 to 66 degrees. Equivalent earthquake magnitude from calculated seismic energies was near 5.1 with a source-seismic energy ratio of 0.47 percent. (Author)

20. PHYSICS

ACNP-65002 **Field 20M**
CFSTI Prices: HC$3.00 MF$0.75
Allis-Chalmers Mfg. Co., Milwaukee, Wis. Atomic Energy Div.
PRIMARY SEPARATION OF STEAM FROM WATER BY NATURAL SEPARATION. PART I.
15 Apr 65, 78p EURAEC-1389
Contract AT (11-1)-1186

Descriptors: (*Steam, Separation), (*Water, Separation).

ACNP-65004 **Field 20M**
CFSTI Prices: HC$3.00 MF$0.75
Allis-Chalmers Mfg. Co., Milwaukee, Wis. Atomic Energy Div.
STEAM SEPARATION TECHNOLOGY.
Quarterly Progress Rept., Apr 1-Jun 30, 65.
9 Jul 65, 75p EURAEC-1417
Contract AT (11-1)-1186

Descriptors: (*Steam, Separation).

AD-403 292 **Field 20L, 9A, 13H**
CFSTI Price: HC$2.00
Raytheon Co., Waltham, Mass., Research Div.
FINE GRAIN DENSE FERRITES.
Quarterly progress rept. no. 1, 4 Dec 62-3 Mar 63,
by J. S. Waugh, J. J. Green, A. E. Paladino, andW. R. Bekebrede. 3 Mar 63, 48p
Contract DA-36-039-AMC-00098 (E),
Task DA-3A99-15-006-02

Descriptors: (*Ferrites, Manufacturing methods), Radiofrequency, Microwave frequency, Flame spraying, Nickel compounds, Zinc compounds, Iron compounds, Aluminum compounds, Oxides, X-ray diffraction analysis, Presses (Machinery), Grain structures (Metallurgy), Ceramic materials, Ferromagnetism, Cobalt compounds, Density, Nitrates.

The purpose of the work is to develop and refine the techniques of preparation and evaluation of fine grained dense ferrites for use at both radio frequencies and microwave frequencies. Specifically, the radio-frequency applications are related to the temperature stabilized initial permeability that results from decreasing grain size while the microwave-frequency applications are related to the improved high-power characteristics that result from fine grain sizes. The construction of a flame-spray apparatus was accomplished and compositions prepared. X-ray analysis indicated single phase, stoichiometric compounds were formed in all cases. Hot pressed specimens of NiFe204 were prepared with grain sizes ranging from 5 microns to below 0.2 microns and ferrimagnetic resonance linewidths determined. The usual physical properties of ceramic specimens were determined for all samples. Linewidth measurements were made on samples of Ni (0.973)Co (.027)Fe204 that were prepared by the Signal Corps. (Author)

AD-404 268 **Field 20L, 9A, 13H**
CFSTI Price: HC$3.00
Eagle-Picher Research Labs., Miami, Okla.
GALLIUM PHOSPHIDE DEVICES.
Quarterly technical rept. no. 1, 14 Dec 62-14 Mar 63,
by L. E. Stone, S. Roderique, J. Budiselic, andL. Brown. 14 Apr 63, 61p
Contract DA-36-039-AMC-00103 (E)

Descriptors: (*Gallium alloys, Phosphorus alloys), (*Phosphorus alloys, Gallium alloys), (*Semiconductor devices, Manufacturing methods), Single crystals, Crystal growth, Crystal structure, Etched crystals, Melting, Vapors, Impurities, Plating, Indium alloys, Gold alloys, Chemical milling, Chlorine, Synthesis (Chemistry), Intermetallic compounds.

Synthesis of gallium phosphide by an open flow technique, by passing P vapor over Ga203 in a H atmosphere was accomplished. Variations in color, and unreacted components were noted. Some involving varying temperatures, flow rates and time were carried out for the purpose of rationalizing product differences. Synthesis was best when P temperature and flow rate were low; and when the Ga203 charge had minimum temperature gradients across it. Melt growth of the synthesized material was carried out. A total of 15 melts were made. Several were aborted due to malfunctions in furnacing. Several were partially successful, but produced heavily occluded ingots. Several were succesful in that ingots were clear, with few if any

inclusions and good crystal structure, although not single crystal. Vapor phase growth studies were done in parallel with melt growth. Initial results appear promising. (Author)

AD-426 114 **Field 20E, 20L**
CFSTI Price: HC$3.00
Perkin-Elmer Corp., Norwalk, Conn.
RUBY IMPROVEMENT FOR LASERS, TASK II.
Final rept., 1 May 62-31 Aug 63.
14 Sep 63, 90p PE-TR-M7455
Contract DA-36-039-sc-89091,
Proj. DA-3A-99-21-001-05

Descriptors: (*Lasers, Ruby), (*Ruby, Lasers), Optical materials, Crystal growth, Optical properties, Solid state physics.

Instruments and techniques are described for measuring properties of ruby laser material including scatter, fluorescent linewidth, optical density, uniformity of index of refraction, and lineage. Results are reported of these measurements for 37 ruby boules grown by Linde Company on Contract DA36-039 sc-89089 and for 40 laser rods fabricated from these boules. Correlations of the measured properties and growth parameters as reported by the Linde Company, and of measured properties and threshold for laser action as measured at USAELRDL, Fort Monmouth, New Jersey, are presented.

AD-439 628 **Field 20E, 20L**
CFSTI Price: HC$2.00
Bell Telephone Labs., Inc., Murray Hill, N. J.
SOLID-STATE MASER RESEARCH (OPTICAL).
Quarterly rept. no. 2, 14 Nov 63-14 Feb 64.
14 Feb 64, 46p
Contract DA-36-039-AMC-02333 (E),
Proj. DA-1G6-22001-A-056

Descriptors: (*Lasers, Scientific research), Europium, Terbium, Crystals, Excitation, Measurement, Ruby, Cylindrical bodies, Absorption, Spectroscopy, Symmetry (Crystallography), Voltage, Interference, Oscillators, Fluorescence.

Research on optical masers and the exploration of possible optical maser devices are the principal objectives of the work carried out under this contract. Part I gives a detailed account of the crystal field calculations for some states of Eu3+ and Th3+ in YAG. Part II reports on measurements of the output beam characteristics of high quality ruby rods. Finally in Part III are summarized some long range transmission measurements that have been conducted over a distance of approximately 23 miles. (Author)

AD-450 627 **Field 20E**
CFSTI Price: HC$2.00
General Telephone and Electronics Labs., Inc., Bayside, N. Y.
CHELATE LASERS.
Annual technical summary rept. 1 Oct 63-30 Sep 64,
by A. Lempicki, H. Samelson, and C. Brecher. 30 Oct 64, 50p TR-64-052.7
Contract Nonr-4134 (00), ARPA Order-306-62
See also AD-422 363.

Descriptors: (*Lasers, Materials), (*Chelate compounds, Lasers), (*Europium compounds, Lasers), Solutions, Spectroscopy, Solvents, Salts, Optical properties, Power, Aromatic compounds, Esters, Emissivity, Molecular energy levels.

Progress in the following lines of research is reported: (1) solution chemistry, spectroscopic properties, solvent effects, salt effects, and effects of laser action on europium chelates; (2) output power, output beam characteristics, and quality of the optical cavity of chelate lasers.

AD-451 744 **Field 20L, 11B**
CFSTI Price: HC$2.00
Arizona State Univ., Tempe.
OXIDE SEMICONDUCTOR MATERIALS AND DEVICE RESEARCH.
Quarterly progress rept. no. 11, 18 May-17 Aug 64,
by F. L. English, C. J. Kevane, J. J. Morrison, B. M. Warmkessel and H. B. Whitehurst. 17 Aug 64, 30p
Contract DA-36-039-sc-89151,
Task DA-1P6-22001-A-056

Descriptors: (*Rutile, Semiconductors), (*Semiconductors, Rutile), Diodes (Semiconductors), Oxides, Ceramic materials, Resistance (Electrical), Equations, Temperature, Titanium compounds, Dioxides, Electrical properties, Admittance, Surface properties.

An empirical equation has been developed to describe the resistance of semiconducting rutile as a function of time during approach to equilibrium after a sample has been heated and cooled rapidly. The new equation has been found to represent the observed data more accurately than the one which had been used in previous reports of this series. Three constants are involved in the equation, two of which represent the equilibrium resistance of the sample and the initial value of the resistance. The third constant is characteristic of the individual sample and its temperature and has the dimensions of time. Measurement of the change in resistivity for several samples at different temperatures indicated that the value of the constant with the dimension of time is characteristic of a given sample, and that for the same sample a change in value with temperature occurs. Studies were made of the effect of surface treatment on the time dependent resistivity. Measurement of the admittance of diodes made from semiconducting ceramic rutile continue to show agreement with theoretional predictions over a wide range of frequencies.

AD-465 771 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
STRESSES IN A BUCKLED RECTANGULAR COLUMN.
Technical rept.,
by Samuel Lubkin. May 65, 28p IMM-NYU-339
Contract Nonr-285 (46),
Proj. NR-041-019

Descriptors: (*Beams (Structural), Stresses), (*Stresses, Rectangular bodies), Buckling (Mechanics), Steel, Mathematical analysis, Deflection, Deformation.

The maximum compressive stress in and the total load on a rectangular column, which has been loaded beyond the critical buckling load, are evaluated, using non-linear theory but plane strain conditions. The results are given in the form of power series expansions. The coefficients in these expansions and several other quantities of interest are given both as power series with the Euler critical strain as parameter and in tabular form for 20 slenderness ratios of the column. The results are applied to structural steel columns and it is determined that the load causing column failure is trivially greater than the critical load initiating buckling except for relatively thick columns which fail prior to buckling and for very slender columns, of proportions not used in normal practice. (Author)

AD-465 772 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.75
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
BUCKLING OF A RECTANGULAR COLUMN ON THE BASIS OF MURNAGHAN'S FORMULA FOR STRAIN ENERGY.
Technical rept.,
by Samuel Lubkin. May 65, 36p IMM-NYU-340
Contract Nonr-285 (46),
Proj. NR-041-019
N65 34704

Descriptors: (*Beams (Structural), Buckling (Mechanics)), (*Buckling (Mechanics), Rectangular bodies), Strain (Mechanics), Energy, Elasticity, Functional analysis.

Buckling criteria are derived for a rectangular column for large two-dimensional strains, using a strain energy density function suggested by Murnaghan. This function is analogous to the classical density function in that it involves two elastic constants but is simpler in certain respects. Despite the apparent simplicity, the evaluation proved more difficult than the equivalent analysis using the classical function. As expected, Murnaghan's density function leads to smaller values of critical strains than does the classical but the difference is slight for slender columns. For infinitely thick columns, the critical strain is found to range between 0.344 to 0.372 depending upon the ratio of elastic constants as compared to 0.5 for the classical formula independent of this ratio. (Author)

AD-465 909 **Field 20B, 20D**
CFSTI Prices: HC$3.00 MF$0.75
Perkin-Elmer Corp., Norwalk, Conn. ElectroOptical Div.
OPTICAL SPECTROSCOPY AND CRYSTAL GROWTH OF CeO2 AND ThO2.
Semiannual technical summary rept. for period ending 30 Apr 65,
by Robert C. Linares. 30 Apr 65, 69p PE-ER-8033
Contract Nonr-4660 (00), ARPA Order-306-62
See also AD-619 197.

Descriptors: (*Lasers, Materials), (*Cerium compounds, Dioxides), (*Thallium compounds, Dioxides), (*Crystal growth, Lasers), Fluorescence, Excitation, Erbium, Terbium, Europium, Samarium, Dysprosium, Manganese, Uranium, Spectra (Visible +ULTRAVIOLET), (*Line spectrum, X rays, Impurities.

Identifiers: Ceric oxide, Thorium oxide.

The optical spectra and crystal gorwth of CeO2 and ThO2 were studied to determine their potential usefulness as laser materials. Cyrstal growth was carried out by the flux technique. Phase equilibria and solubility determinations were made in order to select a flux for the growth of spectroscopic samples to eventaully permit the growth of laser size crystals. Erbium, terbium, europium, samarium, dysprosium, manganese, and uranium were incorporated into single crystals of CeO2. Transmission measurements were made on all samples. When samples were observed to fluoresce with X-ray or UV excitation, their emission spectra, excitation spectra, and fluorescent lifetime were studied. The effect of charge compensation on these properties was also studied.

AD-466 305 **Field 20M, 14B**
CFSTI Prices: HC$2.00 MF$0.50
California Univ., Berkeley. Inst. of Engineering Research.
SOME MEASUREMENTS OF ROTATIONAL TEMPERATURES IN A LOW DENSITY WIND TUNNEL USING ELECTRON BEAM FLUORESCENCE,
by F. Robben and L. Talbot. May 65, 42p AS-65-5
Contract Nonr-222 (45), Grant AF-AFOSR-538-65
N65 29271

Descriptors: (*Vortices, Measurement), (*Nitrogen, Temperature), Wind tunnels, Superaerodynamics, Electron beams, Fluorescence, Nozzle gas flow, Jets.

The fluorescence of a 30 kV electron beam was used as a probe to measure the rotational distribution function of flowing nitrogen in a low density wind tunnel. The fluorescence consists predominantly of the so-called first negative system of nitrogen. Measurements of the intensities of the rotational structure of the (0-0) vibrational band have been used to calculate, through a theoretical model, the original rotational distribution function of N2 before excitation. A series of measurements was performed in the undisturbed flows of a subsonic nozzle, a Mach 4 nozzle, and free jet expansions from sonic orifices at Mach numbers ranging up to 19. The rotational temperature measurements are shown to be about 3% high at 280K,

with a progressively increasing error at lower temperatures. These measurements also indicated no measurable lag in rotational temperature in the free jet expansion. (Author)

AD-466 613 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
TRANSIENT TEMPERATURES IN A 30 DEGREE RIGHT TRIANGLE,
by Walter P. Reid. 8 Jun 65, 14p NOLTR-65-96, Math rept. M-58
Task NOL-FR-30

Descriptors: (*Boundary value problems, Heat transfer), (*Heat transfer, Functional analysis), Partial differential equations, Integral transforms, Integrals, Thermodynamics.

The temperature as a function of x, y and t is obtained in a 30 degree right triangle by adding three solutions of the problem for a rectangle. The initial temperature of the region is prescribed, and the sides are maintained at zero degrees. The eigenfunctions do not have variables separable. (Author)

AD-614 240 **Field 20N, 4A**
CFSTI Prices: HC$4.00 MF$0.75
Smyth Research Associates, San Diego, Calif.
TRADEWIND DUCTING.
Final technical rept., 18 Apr-18 Nov 64,
by Edwin D. Bowen, William J. Fay, and D. R. Munoz. Feb 65, 102p SRA-425
Contract AF30 (602)-3363,
Proj. AF-4519,
Task 451902
RADC TR-64-549

Descriptors: (*Radio signals, Propagation), (*Troposphere, Radio transmission), (*Radio communication systems, Propagation), Very high frequency, Temperature inversion, Marine meteorology, Radio ranges, Hawaii, California, Television equipment.

Identifiers: Tradewind ducting, Duct propagation.

An experimental research program is described in this report. The experiment was conducted to gain additional information on the Tradewind Duct mode for VHF communications over the 2500 mile path between Hawaii and Point Buchon on the central California coast. Medium power TV transmitters situated at Maui and Hilo were used as the source, and SRA - 506 phase-locked receivers and medium to high gain antennas were used at the receiving site. Multiple frequencies between 60 and 212 mc/s were used. Data concerning the signal strength versus time, height gain at the receiving terminal, and meteorological data along the path were obtained. This report describes the seasonal and diurnal duty cycle of the ducting mode of propagation and the fading rate and fading depth of the signal received. Correlation between the transmission loss and duty cycle and the meteorological data yields information on the feasibility of predicting this propagation mode. The cumulative distributions of the basic transmission losses are displayed. (Author)

BNL-9209 **Field 20G**
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
NOTE ON THE NORMAL MODE TREATMENT OF BEAM CAVITY INTERACTIONS AND THE MODE WIDTH.
Internal rept.,
by R. L. Gluckstern. 5 May 65, 6p AADD-81
Contract AT (30-2)-GEN-16

Descriptors: (*Particle beams, Cavity resonators), (*Particle accelerators, Oscillation).

BNL-9232 **Field 20H, 18D**
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
A SCATTERING EXPERIMENT USING DIGITIZED DISCHARGE PLANES,
by E. Bleser, E. Anderson and G. B. Collins. 25 May 65, 11p CONF-650510-12
Contract AT (30-2)-GEN-16
Prepared for presentation at Purdue Conference on Instrumentation for High Energy Physics, Lafayette, Ind.

Descriptors: (*Alternating gradient focusing accelerators, Nuclear scattering).

BNL-9243 **Field 20H, 18K**
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
LEAST SQUARES ANALYSIS OF NEUTRON RESONANCE PARAMETERS,
by M. R. Bhat and R. E. Chrion. May 65, 8p
CONF-650705-17
Contract AT-30-1-GEN-16
Presented at International Conference on the Study of Nuclear Structure with Neutrons, Antwerp.

Descriptors: (*Neutron transport theory, Resonance scattering), (*Least squares method, Neutron reactions).

C13.46-18-21 **Field 20N, 9D**
CFSTI Price: MF$0.75
Central Radio Propagation Lab., National Bureau of Standards, Boulder, Colo.
QUARTERLY RADIO NOISE DATA DECEMBER, JANUARY, FEBRUARY, 1963-64.
Technical note,
by W. Q. Crichlow, R. T. Disney and M. A. Jenkins. 25 Jan 65, 91p
NBS TN-18-21
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.50.

Descriptors: (*Atmospherics, Radiofrequency interference), (*Radiofrequency interference, Atmospherics), Radio waves, Noise (Radio), Meteorological phenomena, Recording systems, Tables.

Radio noise measurements are being made at eighteen stations in a world-wide network operated in a cooperative program coordinated by the National Bureau of Standards. The locations of these stations are shown on a map. The tabulated values are based on three basic parameters of the noise; these are the mean power, the mean envelope voltage, and the mean logarithm of the envelope voltage. The noise power received from sources external to the antenna averaged over a period of several minutes is the basic parameter.

C13.46-206-4 **Field 20N, 17B**
CFSTI Price: MF$0.50
Central Radio Propagation Lab., National Bureau of Standards, Boulder, Colo.
THE NORMAL PHASE VARIATIONS OF THE 18 kc/s SIGNALS FROM NBA OBSERVED AT COLLEGE, ALASKA.
Technical note,
by J. H. Crary and A. C. Murphy. 30 Sep 65, 26p
NBS TN-206-4
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.25.

Descriptors: (*Radio transmission, Phase shift), (*Phase shift, Radio transmission), Very low frequency, Radio waves, Ionospheric propagation, Radio transmitters, Panama, Radio receivers, Alaska.

Observations of the normal phase variations of the 18 kc/s signals radiated from the Canal Zone and received in College, Alaska, U.S.A., are given in the form of monthly averages and standard deviations at five minute intervals. The relations between the diurnal phase variations and the diurnal variation in the length of sunlit path are shown. The calculated mean diurnal change in effective height of reflection is 16 km. Values of the short term phase differences are also given. (Author)

C13.46-314 **Field 20D, 1A**
CFSTI Price: MF$0.75
National Bureau of Standards, Boulder, Colo.
STABILITY OF TWO-PHASE ANNULAR FLOW IN A VERTICAL PIPE,
by Stephen Jarvis, Jr. 7 Jun 65, 96p Technical note TN-314
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.55.

Descriptors: (*Two-phase flow, Stability), (*Pipes, Two-phase flow), Fluid dynamic properties, Incompressible flow, Mathematical analysis, Base flow.

The theory of hydrodynamic stability for infinitesimal disturbances is applied to the steady symmetric annular flow of two incompressible fluids in a vertical pipe. The resulting 12 x 12 complex determinant for the determination of curves of neutral stability is reduced, by suitable approximations, to an 8 x 8 one, and numerical methods are used to determine some neutral curves for air-water mixtures. (Author)

COO-720-047 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.75
Case Inst. of Tech., Cleveland, Ohio. Nuclear Physics Lab.
EXCHANGE EFFECTS IN SCATTERING OF SLOW ELECTRONS BY ATOMS,
by Chinh Le Diah. 1963, 61p
Contract AT (11-1)-720

Descriptors: (*Nuclear scattering, Electrons).

CU-1932-243 **Field 20H**
CFSTI Prices: HC$4.00 MF$1.00
Nevis Labs., Columbia Univ., Irvington-on-Hudson, N. Y.
PRODUCTION OF PIONIC RESONANCES IN PI (+) PLUS P INTERACTIONS AROUND 2.5. Bev/c.
Doctoral thesis,
by Norman Gelfand. Jun 65, 123p NEVIS-137
Contract AT (30-1)-1932

Descriptors: (*Resonance scattering, Pions), (*Pions, Proton scattering).

IDO-17107 **Field 20H, 18K**
CFSTI Prices: HC$3.00 MF$0.75
Phillips Petroleum Co. Idaho Falls, Idaho. Atomic Energy Div.
EFFECTIVE CROSS-SECTION FACTORS,
by R. G. Nials. Aug 65, 90p
Contract AT (10-1)-205

Descriptors: (*Neutron cross sections, Reactor kinetics), (*Reactor kinetics, Neutron transport theory).

LA-DC-6514 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
A CALCULATIONAL METHOD FOR THE DETERMINATION OF SURFACE TENSIONS FROM PHOTOGRAPHED MENISCI--WITH APPLICATION TO WATER AND MERCURY,
by J. C. Biery and J. M. Oblak. 1960, 39p
Contract W-7405-eng-36

Descriptors: (*Surface tension, Water), (*Mercury, Surface tension).

LA-3379 **Field 20B**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
A SIMPLE EXPRESSION FOR THE QUARTIC ANHARMONIC CONTRIBUTION TO THE

HELMHOLTZ FREE ENERGY OF A SPECIAL MODEL OF AN F.C.C. CRYSTAL,
by A. A. Maradudin. Aug 65, 9p
Contract W-7405-eng-25

Descriptors: (*Crystals, Energy), (*Approximation (Mathematics), Energy).

N65-34909 **Field 20I**
CFSTI Prices: HC$1.00 MF$1.25
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
PLASMA JET TECHNOLOGY.
Technology survey,
by D. W. Gates, J. B. Bond, P. R. Dennis, andC. R. Smith. Oct 65, 200p NASA-SP-5033
Performed in cooperation with Clyde Williams and Co., Columbus, Ohio.

Descriptors: (*Plasma jets, Scientific research).

N65-35832 **Field 20L**
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration. Langley Station, Va. Langley Research Center.
EXPERIMENTAL STUDY OF TRANSIENT EFFECTS IN DIELECTRIC MATERIALS CAUSED BY ELECTRON IRRADIATION,
by George M. Storti, Donald H. Phillips andClifford S. Frank. Oct 65, 59p NASA-TN-D-3032

Descriptors: (*Transients, Dielectrics).

N65-35838 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Langley Station, Va. National Aeronautics and Space Administration, Langley Research Center.
VIBRATION TESTS OF PRESSURIZED THIN-WALLED CYLINDRICAL SHELLS,
by Robert Miserentino and Louis F. Vosteen. Oct 65, 48p NASA-TN-D-3066

Descriptors: (*Cylindrical bodies, Vibration), (*Structural shells, Vibration).

N66-10327 **Field 20M, 1A**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
AN INVESTIGATION OF HEAT TRANSFER WITHIN REGIONS OF SEPARATED FLOW AT A MACH NUMBER OF 6.0.
Technical note,
by Paul F. Holloway, James R. Sterrett andHelen S. Creekmore. Nov 65, 96p NASA-TN-D-3074

Descriptors: (*Heat transfer, Flow separation), (*Hypersonic flow, Heat transfer).

N66-10328 **Field 20K, 11F**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
FATIGUE OF RENE 41 UNDER CONSTANT- AND RANDOM-AMPLITUDE LOADING AT ROOM AND ELEVATED TEMPERATURES.
Technical note,
by Edward P. Phillips. Nov 65, 28p NASA-TN-D-3075

Descriptors: (*Loading (Mechanics), Nickel alloys), (*Nickel alloys, Fatigue (Mechanics)).

Identifiers: Rene 41.

N66-10745 **Field 20M**
CFSTI Prices: HC$6.00 MF$1.25
Georgia Inst. of Tech., Atlanta.

HEAT TRANSFER TO A GAS CONTAINING A CLOUD OF PARTICLES.
Contractor rept.,
by J. Andrew McAlister, Edward Y. H. Keng, andClyde Orr, Jr. Nov 65, 180p
Grant NsG-273
NASA CR-325

Descriptors: (*Heat transfer, Gases), (*Gases, Heat transfer), Thermal radiation.

N66-11254 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
EXPERIMENTS TO DETERMINE ELASTIC MODULI FOR FILAMENT-WOUND CYLINDERS.
Technical note,
by Michael F. Card. Nov 65, 28p NASA-TN-D-3110

Descriptors: (*Filament wound construction, Elasticity), (*Cylinders, Filament wound construction).

N66-11255 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
BUCKLING AND POSTBUCKLING TESTS OF RINGSTIFFENED CIRCULAR CYLINDERS LOADED BY UNIFORM EXTERNAL PRESSURE.
Technical note,
by Donaldson A. Dow. Nov 65, 21p NASA-TN-D-3111

Descriptors: (*Stiffened cylinders, Buckling (Mechanics)), (*Buckling (Mechanics), Pressure).

N66-11257 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EFFECTS OF METASTABLE ATOMS ON VOLUME ION PRODUCTION IN A TENUOUS HELIUM PLASMA.
Technical note,
by Ronald J. Sovie and John V. Dugan, Jr. Nov 65, 32p NASA-TN-D-3121

Descriptors: (*Ions, Plasma physics), (*Plasma physics, Helium).

NMI-4997 **Field 20J, 11F**
CFSTI Prices: HC$6.00 MF$1.25
Nuclear Metals, West Concord, Mass.
TECHNICAL PAPERS OF THE METALLOGRAPHIC GROUP MEETING (15th), HELD MAY 17-19, 1961, AT SAVANNAH RIVER LABORATORY, AIKEN, SOUTH CAROLINA,
by H. Roth Roman. 1 May 64, 241p CONF-610501
Contract AT (30-1)-1565

Descriptors: (*Reactor materials, Metals).

NYO-2391-12 **Field 20B, 12A**
CFSTI Prices: HC$2.00 MF$0.50
Cornell Univ., Ithaca, N. Y. Lab. of Atomic and Solid State Physics.
AN APPROXIMATE TECHNIQUE FOR CALCULATING LOCALIZED MODES,
by J. A. D. Matthew. Jun 65, 30p
Contract AT (30-1)-2391

Descriptors: (*Crystal lattice defects, Oscillation), (*Approximation (Mathematics), Crystal lattice defects).

OTR-134 **Field 20L, 20C**
National Bureau of Standards. Washington, D. C. Inst. for Applied Technology.
PHOTOCONDUCTIVITY.
Jan 66, 32p
Prepared in cooperation with Westinghouse Electric Corp., Baltimore, Md. Available free from the Clearinghouse.

Descriptors: (*Photoconductivity, Bibliographies), Abstracts, Semiconductors, Materials, Spectra (Infrared), Millimeter waves, Cryogenics.

Significant reports covering the period since 1962 were selected for this study with reference to relevant earlier works. Recent Government-sponsored research and development (R and D) in photoconductivity has been directed along three broad lines (1) theoretical analysis, (2) materials research and (3) systems applications and requirements. These areas are further subdivided in the introduction. Materials and systems have been developed for the detection of visible, infrared, and millimeter wave energy. Auxiliary cooling systems have been developed for applications where the energy gap is low. Much work has gone into developing techniques for analyzing and predicting the photoconductive process. (Author)

OTR-135 **Field 20C**
National Bureau of Standards. Washington, D. C. Inst. for Applied Technology.
ELECTROLUMINESCENCE.
Feb 66, 24p
Available free from the Clearinghouse.

Descriptors: (*Electroluminescence, Bibliographies), Abstracts, Display systems, Light, Sources, Illumination, Semiconductors, Diodes (Semiconductor).

Significant reports covering the period since 1962 were selected for this study, with reference to relevant earlier works. Recent research in the field of electroluminescence considers both intrinsic (AC) electroluminescence and carrier injection (DC) electroluminescence and concerns (1) investigation of material properties and fabrication techniques; (2) assembly and testing of various electroluminescent screens and display panels; and (3) use of carrier injection luminescent diodes as light sources. (Author)

Patent 3,218,916 **Field 20F**
WAVE FRONT SHEARING INTERFEROMETER.
Patent assigned to Commerce,
by James B. Saunders. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Interferometers, Prisms (Optics)), Mirrors, Electromagnetic waves, Light, Patents.

Wave-front shearing interferometers include two beam dividers, two mirrors, and two compensating plates, each of which is adjustably mounted on a flat plate. The beam dividers and mirrors are incorporated into two prisms to avoid temperature and vibration effects. Each prism has an entrance, a common, a reflecting, and an exit face.

PB-168 771 **Field 20I, 20G**
CFSTI Prices: HC$2.00 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
EXTENSION DE LA LOI DE CHILD-LANGMUIR A UN FAISCEAU DE PARTICULES ANIME D'UNE VITESSE DIRIGEE (EXTENSION OF THE CHILD-LANGMUIR LAW TO A BEAM OF PARTICLES HAVING AN INITIAL VELOCITY),
by Richard Geller. Nov 65, 27p CEA-R-2898
Text in French; Attached Summary in English.

Descriptors: (*Particle beams, Plasma accelerators), (*Plasma accelerators, Particle beams), Velocity, Electric currents, Plasma medium, France.

A DC. ion current of 50 mA/sq cm has been obtained with approximately 100 volts extraction from the plasma created by the CIRCE device,

and a still stronger electron current was obtained with a still lower extraction. These results are an order of magnitude higher than the ordinary characteristics. In the neutral plasma beam produced in the CIRCE device, the ions have mainly longitudinal energy whereas the electron energy is transverse. This situation makes the charge separation easier. In the present paper one tries to explain partially the result on a basis of current increase due to the initial velocity of the particles. (Author)

PB-168 890 **Field 20H, 12A**
CFSTI Prices: HC$2.00 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
MESURE DES INTEGRALES DE RESONANCE D'ABSORPTION (Mn, Fe, Co, Ni, Cu, Zr, Mo) (Measurement of Capture Resonance Integrals (Mn, Fe, Co, Ni, Cu, Zr, Mo)),
by Rene Vidal and Eduardo Cardoso-Martinho.
Nov 65, 40p CEA-R-2840
Text in French; Attached summary in English.

Descriptors: (*Resonance absorption, Integrals), (*Transition elements, Resonance absorption), Manganese, Iron, Cobalt, Nickel, Copper, Zirconium, Molybdenum.

The measurements are carried out with the oscillation technique, without a cadmium tube, in a spectrum rich in epithermal neutrons. The samples consist in metal plates or deposits on aluminium. The values of the resonance integrals, not including the 1/v part and corresponding to zero thickness, are the following: Mn : 10.5 ± 1 b ; Fe : 1.1 ± 0.3 b ; Co : 50.5 ± 4 b ; Ni : 1.0 ± 0.4 b ; Cu : 2.2 ± 0.3 b ; Zr : 1.06 ± 0.14 b ; Mo : 22.7 ± 1 b. (Author)

PB-168 935 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
LE RAYONNEMENT ELECTRONIQUE D'UN PLASMA DANS UN CHAMP MAGNETIQUE (Electronic Radiation of a Plasma in a Magnetic Field),
by Ernesto Canobbio, Terenzio Consoli, Georges Ichtchenko and Francois Parlange. Oct 65, 48p CEA-R-2881
Text in French, Attached Summary in English.

Descriptors: (*Plasma oscillations, Magnetic fields), Field emission, Plasma medium, Electric discharges, France.

The influence on the microwave spectrum of the number of fast electrons, density, pressure and plasma inhomogenities, has been studied in a hot cathode reflex discharge, operating either in a steady state or in a pulsed regime. Under some conditions a strong emission is observed between the harmonics of the electron gyrofrequency. A theoretical interpretation of the results is advanced by extending a model already proposed by CANOBBIO and CROCI. In particular it is indicated that the transition radiation can be responsible for the emission observed between the harmonics. (Author)

PB-168 954 **Field 20B, 8G**
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge.
RESEARCH ON THE STRUCTURES AND PROPERTIES OF CRYSTALS.
Final rept.,
by M. J. Buerger. 1 Dec 61, 16p
Grant NSF-G6601

Descriptors: (*Crystallography, Minerals), (*Minerals, Crystal structure), Silicon compounds, Dioxides, Twinning (Crystallography), Diffraction analysis, Silicates, Phase studies, Photography, Precession, Absorption, Crystals.

Identifiers: Silicon dioxide, Aluminum silicates.

Research on the following is outlined: Coesite, the dense high-pressure form of silica. Reduced crystallographic cells. Twinning, and the role of coherence in the formation of twin crystals. Relative energies of rings of tetrahedra. Setting angles for the single-crystal diffractometer. Crystallography of mcgovernite (a complex arsenosilicate), andalusite, cahnite, wollastonite and pectonite, tourmaline, kyanite, tourmaline, and narsarsukite. Classification of silicates and other minerals with tetrahedral structures. Polymorphism and phase transformations. Templeton or false symmetry effect (so-called space-group extinctions of x-ray reflections). Well effect in precession photography. Image sets. Algebraic representation of the image sets of points. Drilling coordinates for crystal structure models.

SLAC-45 **Field 20G**
CFSTI Prices: HC$4.00 MF$0.75
Stanford Linear Accelerator Center, Stanford Univ., Calif.
TWO-MILE ACCELERATOR PROJECT.
Quarterly status rept., 1 Jan-31 Mar 65.
Jun 65, 100p
Contract AT (04-3)-515

Descriptors: (*Linear accelerators, Electron accelerators), (*Electron accelerators, Linear accelerators).

WASH-1057 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
COMPILATION OF REQUESTS FOR NUCLEAR CROSS SECTION MEASUREMENTS,
by A. B. Smith. Aug 65, 89p EANDCUS73
Contract W-7405-eng-38

Descriptors: (*Nuclear cross sections, Measurement).

21. PROPULSION AND FUELS

AD-448 472 **Field 21H**
CFSTI Price: HC$3.00
Picatinny Arsenal, Dover, N. J. Ammunition Engineering Directorate.
DEVELOPMENT OF A ROCKET MOTOR FOR THE XM7 AIRCRAFT CAPSULE EJECTION CATAPULT.
Technical memo.,
by Gabriel C. Gratkowski. Mar 64, 57p
PA TM-1224

Descriptors: (*Escape systems (Aerospace), Rocket motors), (*Rocket motors (Solid propellant), Catapults), (*Catapults, Jettisonable cockpits), Nitrocellulose, Solid rocket propellants, Ejection, Thrust, Jet planes, Low altitude, Performance (Engineering), Captive tests.

A novel side thrust rocket motor was developed for ejecting the Goodyear Escape Capsule from high performance aircraft. A nitrocellulose base propellant charge was developed to meet the ballistic performance requirements. The rate of rise of thrust was controlled during the ignition phase so that the capsule would not be subjected to more than 250 G/sec rate of change of acceleration. This was successfully accomplished by a special grain-inhibiting technique in which the exposed surfaces were incrementally inhibited by a dip method. (Author)

AD-451 357 **Field 21H, 21I**
CFSTI Price: HC$4.00
Rohm and Haas Co., Huntsville, Ala. Redstone Arsenal Research Div.
BALLISTIC EVALUATION OF PROPELLANTS IN MICRO-MOTORS,
by Byron L. Cockrell. 22 Oct 64, 119p S-49
Contracts DA-01-021-ORD-11878 (Z), DA-01-021-ORD11909 (Z)

Descriptors: (*Propellants, Tests), (*Rocket motors, Test equipment), Ballistics, Two-phase flow, Heat transfer, Scale, Manufacturing methods, Reliability.

Identifiers: Evaluation.

Development of a 10-gm micro-motor for ballistic evaluation of novel propellants was initiated in early 1960. Several thousand micro-motors containing a variety of propellant formulations were fired demonstrating that reliable precise ballistic data could be obtained if proper experimental techniques were used. An extensive series of static tests showed that specific impulse could be scaled when corrections were made for heat-loss and two-phase-flow effects. These scaling factors could be obtained from a series of micro-motor tests requiring as little as 2 pounds of propellant. The report is a summary of all previous reports on the development of micro-motors and small-scale testing and it is directed toward those groups which might wish to use the Rohm and Haas micro-motor system for propellant evaluation purposes. Accordingly, the areas of system design features, motor preparation and assembly, ignition, data acquistion, data reduction, scaling effects, scaling-factor determination, and specific-impulse prediction are treated in considerable detail. Sufficient information is provided to allow interested agencies to duplicate the hardware system, conduct static tests, obtain valid ballistic data on scaling factors, and make specific-impulse predictions. (Author)

AD-467 048 **Field 21H, 16D**
CFSTI Prices: HC$2.00 MF$0.50
Ballistic Systems Div., Norton AFB, Calif.
A REVIEW OF THE MINUTEMAN PROPULSION SURVEILLANCE PROGRAM FOR ASSESSING ROCKET MOTOR SERVICE LIFE.
Progress rept., Jan 60-Jun 65,
by Eugene L. Larson. Jun 65, 42p BSD-TR-65-380

Descriptors: (*Guided missiles (Surface-to-surface), Rocket motors (Solid propellant)), (*Rocket motors (Solid propellant), Life expectancy), Aging (Materials), Storage, Management planning, Sampling, Performance (Engineering), Boosteor motors, Secondstage motors, Third-stage motors, Guided missile components, Failure (Mechanics), Analysis.

Identifiers: Minuteman.

The primary objectives of the MINUTEMAN Propulsion Surveillance Program are (1) to evaluate the storage behavior of the various subsystems and components of the MINUTEMAN propulsion system so as to reliably predict the service life of the operationally deployed missile motors, and (2) to identify and verify failure modes in sufficient time to allow for orderly replacement of the missile force without significant degradation in reliability. At the time the MINUTEMAN Weapon System was being developed, the requirement for predicting the operational service life of the motors was recognized as an essential goal of the program. Unlike liquid engines, solid propellant motors cannot be periodically nondestructively test fired to identify aging trends and failure modes. Consequently, the MINUTEMAN Propulsion Surveillance Program was established by Ballistic Systems Division in 1960 to provide aging data on a continuing basis to determine possible motor reliability degradation. The MINUTEMAN Propulsion Surveillance Program is unique among solid rocket aging studies as it consists of not only a full scale motor program but also a component program and a laboratory sample program. The Surveillance Program is presently being conducted by the Ballistic Systems Division and by the 2705th Airmunitions Wing, Hill Air Force Base, Utah. (Author)

AD-475 535 **Field 21B, 11L, 18C**
CFSTI Prices: HC$2.00 MF$0.40
Naval Civil Engineering Lab., Port Hueneme, Calif.
IGNITION OF THICK WOOD SPECIMENS BY HIGHTEMPERATURE THERMAL RADIATION.
Final rept., Jan 63-May 65,
by F. W. Brown, III Nov 65, 45p Technical rept. TR-320
Proj. Y-F011-05-02-336

Descriptors: (*Nuclear explosions, Thermal radiation), (*Wood, Ignition), (*Thermal radiation, Wood), Simulation, Carbon arc lamps, Test methods, Experimental data, Graphics.

An investigation was undertaken to determine the probability of ignition of thick woods by thermal radiation. A carbon-arc source was used to simulate the thermal radiation from a nuclear weapon. Measurements were made to determine the irradiance and time necessary to produce glow and flaming ignition in ponderosa pine, Douglas fir, and maple. The results of this study are presented in the form of graphs of irradiance as a function of time for several moisture contents for each type of wood. In all cases on the graphs, the locations of the areas of char, persistent glowing ignition, and persistent flaming ignition are shown. The values of Q, total thermal energy necessary to produce sustained burning (with or without flame), can be easily computed from these data. They range from a minimum value of about 19 cal/sq cm for very dry pine to several thousand calories/sq cm for wood with a very high moisture content. It was concluded that for sound solid woods of a normal moisture content, it is almost impossible to start continued ignition with nuclear weapons of a size less than about 100 Mt at a distance where blast damage would not be severe. An appendix describes the high-intensity thermal-radiation facility used to conduct the investigation. (Author)

LA-3301 **Field 21F, 18L**
CFSTI Prices: HC$4.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
NRDS ANALYSIS OF THE KIWI B-4D-202 NUCLEAR REACTOR CONTROL SYSTEM,
by Thomas O. Hearn. Aug 64, 103p
Contract W-7405-eng-36

Descriptors: (*Nuclear propulsion, Rocket propulsion), (*Reactor control, Power reactors).

N65-23193 **Field 21H**
CFSTI Prices: HC$3.00 MF$0.75
Bendix Products Aerospace Div. Bendix Corp., South Bend, Ind.
FLUID STATE AMPLIFIER AND COMPENSATION FOR THE MODEL NV-B1 GIMBAL ACTUATOR.
Final Rept., 29 Jun 64-29 Mar 65,
by G. R. Howland. 12 Apr 65, 81p BPAD-864-15651R
Contract NAS8-5407
NASA CR-62522

Descriptors: (*Thrust vector control systems, Rocket motors), (*Fluid amplifiers, Thrust vector control systems).

N65-34240 **Field 21C**
CFSTI Prices: HC$2.00 MF$0.50
Lewis Research Center. National Aeronautics and Space Administration. Cleveland, Ohio.
COLLOID THRUSTOR BEAM ANALYSIS: DESIGN AND OPERATION OF A SUITABLE QUADRUPOLE MASS FILTER,
by Carl T. Norgren, Daniel S. Goldin, and Denis J. Connolly. Oct 65, 45p
NASA TN-D-3036

Descriptors: (*Electric propulsion, Colloids).

N65-35841 **Field 21H**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ANALYSIS OF CHUGGING IN LIQUID-BIPROPELLANT ROCKET ENGINES USING PROPELLANTS WITH DIFFERENT VAPORIZATION RATES,
by Leon M. Wenzel and John R. Szuch. Oct 65, 14p NASA-TN-D-3080

Descriptors: (*Rocket motors (Liquid propellant), Performance (Engineering)).

N66-10324 **Field 21B, 21H**
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
A COLD GAS, SHORT DURATION TECHNIQUE FOR HIGH ALTITUDE, UNDEREXPANDED JET EXHAUST IMPINGEMENT STUDIES.
Technical note,
by A. J. Gopin and E. L. Margolin. Nov 65, 46p NASA-TN-D-2943

Descriptors: (*Exhaust gases, Jets), (*Rocket motors, Exhaust gases).

Identifiers: Jet impingement.

N66-12148 **Field 21B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
MAGNETIC CONTROL OF THE FLOW OF HOT COMBUSTION GASES IN HYDROGEN-OXYGEN COMBUSTION AT 14 ATMOSPHERES.
Technical note,
by Ronald Razner. Dec 65, 18p NASA-TN-D-3139

Descriptors: (*Combustion chamber gases, Control), (*Gas flow, Control systems).

Patent 3,222,233 **Field 21I**
METHYLAMINE NITROFORM OXIDIZER IN NITROCELLULOSE, ALUMINUM AND METRIOL TRINITRATE PROPELLANTS.
Patent assigned to Navy,
by Anthony J. Matuszko and Marguerite S. Chang. 7 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Solid rocket oxidizers, Preparation), (*Organic nitrogen compounds, Solid rocket oxidizers), Amines, Carbon tetrachloride, Nitrocellulose, Aluminum, Composite propellants, Patents.

Identifiers: Methylamine nitroform.

The polynitro compunds are used in rocket propellant formulations to increase the specific impulse of the formulations. Methylamine nitroform is prepared by reacting methylamine with a solution of nitroform in carbon tetrachloride.

PB-169 060 **Field 21E, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
JETCAL ANALYZER BH109C (HOWELL INSTRUMENTS).
Technical manual instrument calibration procedures, ST-06.
15 Aug 65, 14p NAVWEPS-17-20ST-06
Supersedes interim edition released 15 Apr 64.

Descriptors: (*Jet engines, Test equipment), (*Jet equipment, Calibration), Temperature sensitive elements, Instruction manuals, Test methods.

Identifiers: Engine analyzers.

The Howell Instruments BH109C jetcal analyzer, which consists of a BH111C analyzer, a BH110C probe case, and accessories, is designed primarily to test aircraft engines for exhaust gas temperatures and rpm. The probes, which are calibrated in section 6 of this procedure, are the only accessories requiring calibration.

22. SPACE TECHNOLOGY

AD-454 404 **Field 22C**
CFSTI Price: HC$6.00
Aerospace Corp., El Segundo, Calif. Technical Operations.
TRACE. AEROSPACE ORBIT DETERMINATION PROGRAM,
by R. J. Mercer. Nov 64, 222p TDR-269 (4110-04)-1
Contract AF04 (695)-269
SSD TDR-64-159

Descriptors: (*Orbital trajectories, Determination), Satellites (Artificial), Satellite tracking systems, Errors, Analysis.

Identifiers: TRACE.

TRACE is a multiple-purpose satellite orbit-determination program for the IBM 7090 computer. Its applications include: (1) prediction - the generation of a satellite trajectory and associated ground trace and station sighting data; (2) orbit determination - estimation of trajectory parameters, station locations, and observational biases, so as to best fit a set of observations; and (3) error analysis - estimation of the potential accuracy attainable by a tracking system, given the station locations, the data types, rates and quality, the uncertainties in the model parameters, and the specifications of the nominal orbit. The report contains the objectives of the program, some theoretical foundations, the equations and methods employed, the structure of the program, and complete instructions for its use.

N65-35837 **Field 22B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
A DESCRIBING-FUNCTION ANALYSIS OF THE STABILITY OF A LAUNCH VEHICLE WITH NONLINEAR THRUST VECTORING,
by Harold C. Lester. Oct 65, 39p NASA-TN-D-3064

Descriptors: (*Launch vehicles (Aerospace), Stability).

N65-35953 **Field 22C**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
STUDY OF DIRECT-RETURN RENDEZVOUS TRAJECTORIES USING CONSTANT-THRUST ENGINES AND RENDEZVOUS OR MANEUVERING THRUSTERS,
by James L. Williams and Herman S. Fletcher. Oct 65, 23p NASA-TN-D-3019

Descriptors: (*Rendezvous trajectories, Analysis).

N66-10320 **Field 22B**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
INTERSTAGE ADAPTER PANEL FLUTTER ON ATLASCENTAUR AC-2, AC-3 AND AC-4 VEHICLES.
Technical memo.,
by Tilak R. Lall. Nov 65, 12p NASA-TM-X-1179

Descriptors: (*Spacecraft, Flutter), (*Panels (Structural), Flutter).

Identifiers: Atlas, Centaur.

N66-10332 Field 22D
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
VIBRATION ANALYSIS OF CLUSTERED LAUNCH VEHICLES.
Technical note,
by Rudolf F. Glaser and Everette E. Beam. Nov 65, 53p NASA-TN-D-3090

Descriptors: (*Launch vehicles (Aerospace), Vibration).

N66-10337 Field 22D
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
A FREQUENCY INDEPENDENT TECHNIQUE FOR EXTRACTING THE RIGID-BODY MOTION FROM THE TOTAL MOTION OF A LARGE FLEXIBLE LAUNCH VEHICLE.
Technical note,
by James C. Howard. Nov 65, 56p NASA-TN-D-3109

Descriptors: (*Launch vehicles (Aerospace), Motion).

N66-10746 Field 22A
CFSTI Prices: HC$5.00 MF$1.00
Midwest Research Inst., Kansas City, Mo.
EFFECTS AND IMPORTANCE OF PENETRATION AND GROWTH OF LIFT ON SPACE VEHICLE RESPONSE.
Contractor rept.,
by Robert R. Blackburn and A. D. St. John. Nov 65, 141p
Contract NAS8-11012

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